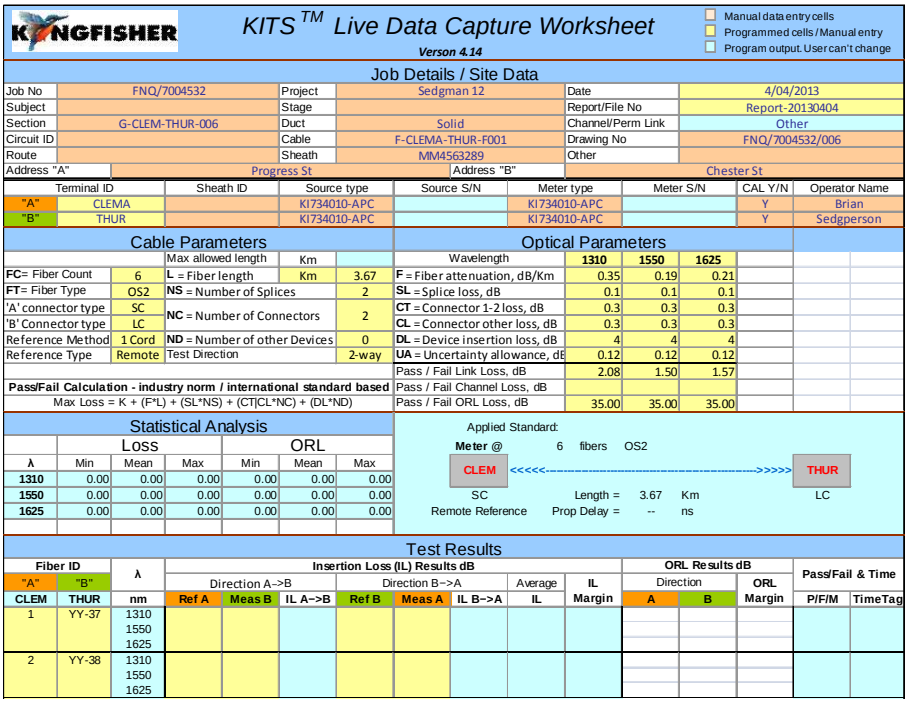
Kingfisher International

User Manual
130805 KITS 4.14

User Manual KITS™ 4.14



KINGFISHER

KITS™ Live Data Capture Worksheet

Verson 4.14

Manual data entry cells
Programmed cells / Manual entry
Program output. User can't change

Job Details / Site Data

Job No	FNQ/7004532	Project	Sedgman 12	Date	4/04/2013
Subject		Stage		Report/File No	Report-20130404
Section	G-CLEM-THUR-006	Duct	Solid	Channel/Perm Link	Other
Circuit ID		Cable	F-CLEMA-THUR-F001	Drawing No	FNQ/7004532/006
Route		Sheath	MM4563289	Other	
Address "A"	Progress St			Address "B"	Chester St

Terminal ID		Sheath ID	Source type	Source S/N	Meter type	Meter S/N	CAL Y/N	Operator Name
"A"	CLEMA		KI734010-APC		KI734010-APC		Y	Brian
"B"	THUR		KI734010-APC		KI734010-APC		Y	Sedgperson

Cable Parameters

		Max allowed length	Km	
FC= Fiber Count	6	L = Fiber length	Km	3.67
FT= Fiber Type	OS2	NS = Number of Splices		2
'A' connector type	SC	NC = Number of Connectors		2
'B' Connector type	LC			
Reference Method	1 Cord	ND = Number of other Devices		0
Reference Type	Remote	Test Direction		2-way

Pass/Fail Calculation - industry norm / international standard based

Max Loss = K + (F*L) + (SL*NS) + (CT|CL*NC) + (DL*ND)

Optical Parameters

Wavelength	1310	1550	1625
F = Fiber attenuation, dB/Km	0.35	0.19	0.21
SL = Splice loss, dB	0.1	0.1	0.1
CT = Connector 1-2 loss, dB	0.3	0.3	0.3
CL = Connector other loss, dB	0.3	0.3	0.3
DL = Device insertion loss, dB	4	4	4
UA = Uncertainty allowance, dB	0.12	0.12	0.12
Pass / Fail Link Loss, dB	2.08	1.50	1.57
Pass / Fail Channel Loss, dB			
Pass / Fail ORL Loss, dB	35.00	35.00	35.00

Statistical Analysis

	Loss			ORL		
λ	Min	Mean	Max	Min	Mean	Max
1310	0.00	0.00	0.00	0.00	0.00	0.00
1550	0.00	0.00	0.00	0.00	0.00	0.00
1625	0.00	0.00	0.00	0.00	0.00	0.00

Applied Standard:

Meter @ 6 fibers OS2

CLEM <<<<<----------->>>>> THUR

SC Length = 3.67 Km LC

Remote Reference Prop Delay = -- ns

Test Results

Fiber ID		λ	Insertion Loss (IL) Results dB								ORL Results dB			Pass/Fail & Time	
"A"	"B"		Direction A->B			Direction B->A			Average	IL	Direction		ORL		
CLEM	THUR	nm	Ref A	Meas B	IL A->B	Ref B	Meas A	IL B->A	IL	Margin	A	B	Margin	P/F/M	TimeTag
1	YY-37	1310													
		1550													
		1625													
2	YY-38	1310													
		1550													
		1625													

Record of Issues

If you have any suggestions for improvement to this document, please contact us at Kingfisher International Pty Ltd.

30 Rocco Drive, Scoresby, Victoria, 3179, Australia
Tel: +61 3 9757 4100
Fax: +61 3 9757 4193
E-mail: sales@kingfisher.com.au
Web: www.kingfisherfiber.com.au

We hope you enjoy using our software

Issue No.	Issue Date.	Comments	Issue Author
1	1993		Bruce Robertson
	2013	Major rewrite	Brian Crook

1. PURPOSE

This User Manual describes the use of Kingfisher International's Test reporting Software (KITS™) for Loss Testing.

It is assumed that the user has basic knowledge of both fibre optical testing and Kingfisher instrument operation.

2. OVERVIEW

KITS™ is is an Excel based test and reporting program used for testing and reporting fiber optic power, attenuation, and integrated optical return loss.

Full-feature capability includes real time interactive data acquisition, data logging, a real time meter display, data file import / export, importing data from instrument memory, and manual data input.

Several International and National standards are bult into KITS™. The user can add additional standards if required.

KITS™ provides fully customisable cable acceptance reporting layouts.

3. WHAT'S NEW IN THIS VERSION

New in version V4.14

- Support for Kingfisher KI2000 series meters
- Support for Windows 8, including Intel RT for tablets.
- Updated support for latest international standards
- Marginal test results displayed in the Live Data sheet
- CSV file export / import function
- Save the KITS^{TM} Excel workbook unlinked to KITS
- Improved cycle time for two way Autotest
- General user experience improvements, and
- Bugs fix in Wavelength Setup and Worst Case selection
- Improved non English language support.

4. QUICK REFERENCE GUIDE

This Section provides a brief summary of the worksheets features.

4.1 KITS Worksheets

The KITS program has 5 worksheets named:-

1. Live Data,
2. Loss Testing,
3. Meter Reading,
4. Data Logging and
5. Memory Dump.

Additional user designed worksheets can be added as required.

4.1.1 Live Data sheet

All loss testing data is entered into the 'Live Data' worksheet which is divided into 4 sections as shown in **Figure 1** below.

- The cable/optical parameters section is normally hidden so as to maximise screen area.
- The Live Data sheet can be configured for 1~4 wavelengths.

The Live Data sheet performs analysis.

- The Live Data sheet can be configured to provide an international, local or user defined standard compliant report.

Data can be entered into the Live Data sheet by :-

- manual entry,
- clicking with a mouse during live testing or
- by memory download direct from instrument
- Import from CSV or RLG file.

KINGFISHER KITS™ Live Data Capture Worksheet
Verson 4.13

Manual data entry cells
Programmed cells / Manual entry
Program output. User can't change

Job Details / Site Data

Job No		Project		Date	27/05/2010
Subject	Admin upgrade 2010/35	Stage		Report/File No	Report-20100527
Section		Duct		Channel/Perm Link	Link
Circuit ID		Cable		Drawing No	FNQ-TI-0049
Route		Sheath		Other	
Address "A"	NW corner of Admin block		Address "B"	Admin Comms room	

	Terminal ID	Sheath ID	Source type	Source S/N	Meter type	Meter S/N	CAL Y/N	Operator Name
"A"	Station 1	N/A			KI LTS	11216	Y	Brian
"B"	Admin	N/A	KI LTS	11216			Y	Bruce

Cable Parameters

		Max allowed length	meter	
FC= Fiber Count	2	L = Fiber length	meter	33
FT= Fiber Type	OS2	NS = Number of Splices		2
'A' connector type	SC APC	NC = Number of Connectors		2
'B' Connector type	LC APC			
Reference Method	1 Cord	ND = Number of other Devices		0
Reference Type	Local	Test Direction		2-way

Pass/Fail Calculation

Max Loss = (F*L) + (SL*NS) + (CT|CL*NC) + (DL*ND) + UA

Optical Parameters

Wavelength	1310	1550
F = Fiber attenuation, dB/Km	0.35	0.21
SL = Splice loss, dB	0.1	0.1
CT = Connector 1-2 loss, dB	0.3	0.3
CL = Connector other loss, dB	0.3	0.3
DL = Device insertion loss, dB	0	0
UA = Uncertainty allowance, dB	0.3	0.3
Pass / Fail Link Loss, dB	1.11	1.11
Pass / Fail Channel Loss, dB		
Pass / Fail ORL Loss, dB	50.00	50.00

Statistical Analysis

	Loss			ORL		
λ	Min	Mean	Max	Min	Mean	Max
1310	0.02	0.05	0.08	0.00	0.00	0.00
1550	0.01	0.03	0.05	0.00	0.00	0.00

Applied Standard: Telstra SMOF installed after Jan/06
Meter @ 2 fibers OS2
Statio <<<<<.....>>>>> Admin
SC APC Length = 33 meter LC APC
Prop Delay = -- ns Local Reference

Test Results

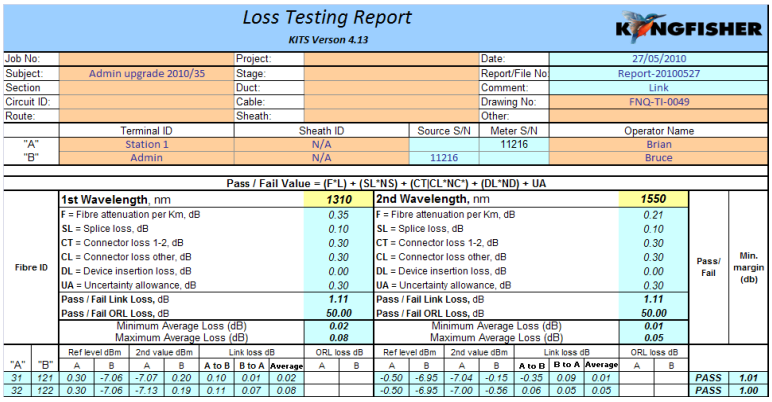
Fiber ID "A"	Fiber ID "B"	λ	Insertion Loss (IL) Results dB: Direction A->B Ref A	Direction A->B Meas B	Direction A->B IL A->B	Direction B->A Ref B	Direction B->A Meas A	Direction B->A IL B->A	Average IL	IL Margin	ORL Results dB: Direction A	Direction B	ORL Margin	Pass/Fail & Time: P/F	TimeTag
Statio	Admin	nm													
31	121	1310	0.30	0.20	0.10	-7.06	-7.07	0.01	0.02	1.09				PASS	03:40:43
		1550	-0.50	-0.15	-0.35	-6.95	-7.04	0.09	0.01						03:40:50
32	122	1310	0.30	0.19	0.11	-7.06	-7.13	0.07	0.08	1.04				PASS	03:41:01
		1550	-0.50	-0.56	0.06	-6.95	-7.00	0.05	0.05						03:41:11

Figure 1, Typical 'Live Data'

4.1.2 Loss Testing sheet

The 'Loss Testing' worksheet is used when the test data is required to be presented in an alternate format to that of the 'Live Data' worksheet.

- The Loss testing worksheet is receive only.
- All data is imported from the 'Live Data' worksheet.
- The Loss testing worksheet can be configured to display one or two wavelengths.



Loss Testing Report
KITS Verson 4.13
KINGFISHER

Job No:		Project:		Date:	27/05/2010
Subject:	Admin upgrade 2010/35	Stage:		Report/File No:	Report-20100527
Section		Duct:		Comment:	Link
Circuit ID:		Cable:		Drawing No:	FNQ-TI-0049
Route:		Sheath:		Other:	

	Terminal ID	Sheath ID	Source S/N	Meter S/N	Operator Name
"A"	Station 1	N/A		11216	Brian
"B"	Admin	N/A	11216		Bruce

Pass / Fail Value = (F*L) + (SL*NS) + (CT|CL*NC*) + (DL*ND) + UA

Fibre ID	1st Wavelength, nm	1310	2nd Wavelength, nm	1550	Pass/ Fail	Min. margin (db)
	F = Fibre attenuation per Km, dB	0.35	F = Fibre attenuation per Km, dB	0.21		
	SL = Splice loss, dB	0.10	SL = Splice loss, dB	0.10		
	CT = Connector loss 1-2, dB	0.30	CT = Connector loss 1-2, dB	0.30		
	CL = Connector loss other, dB	0.30	CL = Connector loss other, dB	0.30		
	DL = Device insertion loss, dB	0.00	DL = Device insertion loss, dB	0.00		
	UA = Uncertainty allowance, dB	0.30	UA = Uncertainty allowance, dB	0.30		
	Pass / Fail Link Loss, dB	1.11	Pass / Fail Link Loss, dB	1.11		
	Pass / Fail ORL Loss, dB	50.00	Pass / Fail ORL Loss, dB	50.00		
	Minimum Average Loss (dB)	0.02	Minimum Average Loss (dB)	0.01		
	Maximum Average Loss (dB)	0.08	Maximum Average Loss (dB)	0.05		

"A"	"B"	Ref level dBm A	Ref level dBm B	2nd value dBm A	2nd value dBm B	Link loss dB A to B	Link loss dB B to A	Link loss dB Average	ORL loss dB A	ORL loss dB B	Ref level dBm A	Ref level dBm B	2nd value dBm A	2nd value dBm B	Link loss dB A to B	Link loss dB B to A	Link loss dB Average	ORL loss dB A	ORL loss dB B		
31	121	0.30	-7.06	-7.07	0.20	0.10	0.01	0.02			-0.50	-6.95	-7.04	-0.15	-0.35	0.09	0.01			PASS	1.01
32	122	0.30	-7.06	-7.13	0.19	0.11	0.07	0.08			-0.50	-6.95	-7.00	-0.56	0.06	0.05	0.05			PASS	1.00

Figure 2, Loss Testing' sheet

4.1.3 Meter Reading sheet

Typically used in a classroom situation or where a large display size is required.

Basic meter functions available are:-

- Change wavelength
- Set reference
- Absolute or relative mode – dBm/dBr
- Hold
- ORL

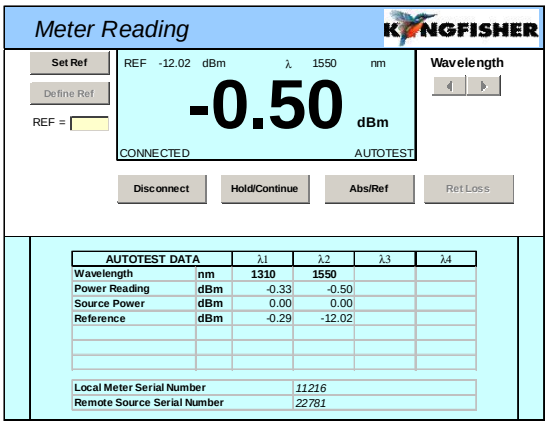


Figure 3, Meter Reading sheet

4.1.4 Data Logging sheet

Data logging is used when it is required to monitor power level over a time period.

Typical applications include source stability, environmental induced changes and test jig failure timing.

Required logging parameters are:-

- Wavelength
- Size of log – number of samples
- Sample interval
- Absolute or relative mode – dBm/dBr

Figure 4, Data logging

4.1.5 Memory Dump sheet

This is a straightforward procedure that is especially useful when an instruments memory contents are not known.

A memory dump may be initiated either from within the KITS™ workbook, via the separate 'Save Csv' program or with KI2000 series instruments via USB download.

All data in an instrument's Memory is extracted to a simple Excel worksheet. No analysis is performed.

Data downloaded from S/N 11216, Date/Time 100527/03:19:04

Fiber	Lambda	Reading	Ref	ORL	Remote Reading	Remote Ref	Remote ORL	Remote S/N
1	1310 nm	-7.17	-37.13					
1	1550 nm	-7.08	-35.55					
2	1310 nm	-7.12	-37.13					
2	1550 nm	-7.09	-35.55					

Figure 5, Memory dump

4.2 KITS™ Save CSV

This feature is independent of the KITS™ software and is similar to the Memory Dump above. It is typically used when the host computer does not use Microsoft Office.

All data in an instruments Memory is extracted to a CSV spreadsheet. No analysis is performed.

Fiber	Lambda	Reading	Ref	ORL	Remote Reading	Remote Ref	Remote ORL	Remote S/N
1	0nm							
2	1310nm	-7.37	-7.63	-28.33	-7.44	-7.28	-27.42	9288
2	1550nm	-7.56	-4.17	-29.4	-7.17	-7.13	-28.75	9288
3	1310nm	-31.35	-7.63	-55.53	-31.65	-7.28	-28.32	9288
3	1550nm	-9.48	-4.17	-30.38	-35.54	-7.13	-29.3	9288
4	1310nm	-8.66	-7.63					

Figure 6, Memory extract via 'Save Csv'

5. FONT CONVENTIONS USED IN THIS MANUAL

The bold italic font, like ***[Kingfisher] / [Data Logging]***, is used for a command (or a command sequence) in Windows menu system, whether it is for Windows, Office, or KITS™.

The text in square brackets, such as [AUTOTEST], is an operation on the test instrument.

6. COMPUTER & INSTRUMENT FIRMWARE REQUIREMENTS

6.1 Computer

Full install:-

- Microsoft Windows 32 / 64 bit: 8 / 7 / Vista / XP. XP requires dotnet 3.5
- Microsoft Office 2013 / 2010 / 2007 / 2003. Office 2003** usually requires additional configuration.
    - ** For Office 2003 only: If not already installed, Microsoft Update KB907417, which will be installed by KITS.

KITS™ support for any non-English language Windows environments is as follows:-

- English language installations of Microsoft Office require a relevant language Microsoft Office MUI (Multilingual User Interface) to run in another language.
- Non-English language installations of Microsoft Office require an English language Microsoft Office MUI.

Compact install:-

This alternative KITS™ CSV "one button" memory download can be installed on Windows computers without MS Office. (also installs with the full version).

- Microsoft Windows 8 / 7/ Vista / XP with dotnet 3.5

6.2 Instrument

KI2000 meter or loss test set (LTS):

Firmware V0.05 and above. Older versions will not work.

The firmware version is displayed on the instrument LCD during turn on. Firmware is field upgradeable. Details on how to upgrade the Firmware are on our web site.

KI 7000 or loss test set (LTS):

Firmware version 5.00 or later. Earlier firmware versions may provide reduced functionality.

The firmware version is displayed on the instrument LCD during turn on. Firmware upgrades must be performed at a service centre.

7. SOFTWARE INSTALLATION

To install KITS™, the user must log into the computer using a profile with local administrator rights.

The latest release of KITS™ is available for download on our web site http://www.kingfisherfiber.com

7.1 Before Installation

If updating from a previous version, you may like to back up existing data before proceeding.

Uninstall older versions prior to installation.

Before installation, ensure that Microsoft Office is installed.

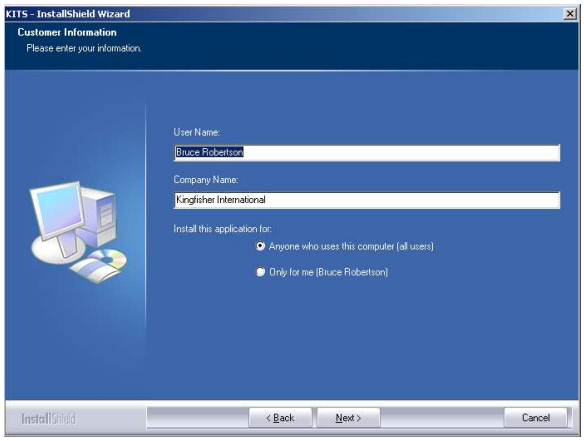
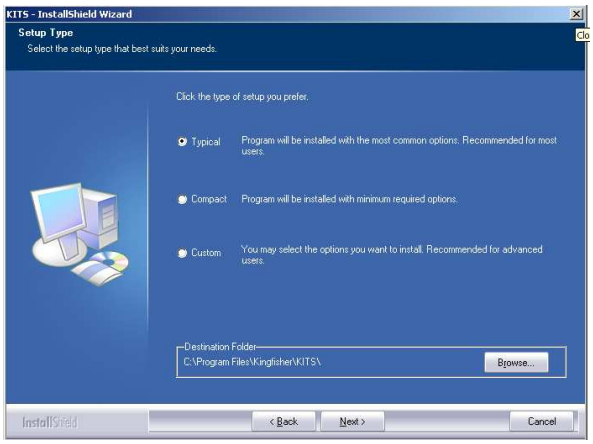
7.2 Special requirements Office 2003

Some installations of Microsoft Office 2003 may require manual configuration to enable Office to use Microsoft .NET Framework. (This happens if Office was installed before Windows .NET).

The installation program will detect if this is required and advise of the requirement.

Step	Procedure
1	Start Control Panel.
2	Select ***[Add/Remove Programs]***
3	Select ***[Microsoft Office]*** and then select ***[Change]***
4	Select ***[Add or Remove Features]*** , then select ***[Next]*** (or Continue) button
5	Select Advanced customization of applications and Next
6	Under Microsoft Office / Microsoft Office Excel, enable .NET Programmability Support
7	Under Office Tools, enable Microsoft Forms 2.0 .NET Programmability Support

7.3 Setup.Exe

Step	Procedure
1	Run the KITS4.14.exe file.
2	Select ***[Next]***
3	Enter Customer information.  **Figure 7,**
4	Select ***[Next]***
5	Choose type of installation. a./ ***[Typical]***. b./ Compact c./ Custom  **Figure 8,** In this instruction 'Typical' is assumed.
6	Select ***[Next]***
7	Check particulars selected
8	Select ***[Next]***
9	KITS program is installed
10	Select ***[Finish]***.

If setup is run again, the user will be prompted to perform a repair, modify (custom) or uninstall.

7.3.1 Where are the KITS™ files located?

Specification spreadsheets:

The default directory for the Master layout Spreadsheet, standards specification excel files, 'Loss Test Standards.xls' and 'User-LossTest-Standards.xls' is:

C:\Documents and Settings\All Users\Application Data\Kingfisher\KITS4.

This may be a hidden directory for some users in Windows Explorer.

Application and configuration files:

The default directory for the application and configuration files is:-

C:\Program Files\Kingfisher\KITS:-

Note: Due to security and administration requirements, Microsoft Windows often places application and configuration files in different locations depending on which version of Windows you are using and how it has been configured.

If the KITS™ files are not in the default directory then:-

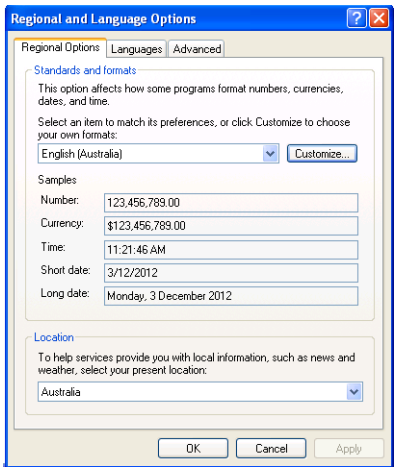
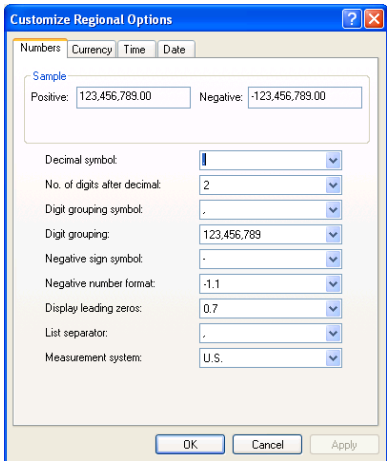
- To locate the KITS™ application files, locate the application shortcut in the Start Menu, right click it, click ***[Properties]***, and then click ***[Find Target]***.
- If you have lost the application shortcuts, try looking for either 'KITS' or 'Kingfisher' in the default Program Files directory on your computer.

KI2000 Device Driver Files:

Further information relating to the KITS™ RS232 and USB driver configuration files is contained in **Appendix B**
RS232 / USB Driver configuration & Installation .

7.3.2 Regional Configuration

Number configuration and distance units are set in the Windows, Regional and Language Options dialogue box.

Step	Procedure
1	Start Control Panel.
2	Select ***[Regional and Language Options]***  **Figure 9,**
3	Select ***[Customize]***  **Figure 10,**
4	Enter required number moderators and distance units as required.
5	Select ***[OK]***
6	Select ***[OK]***
7	Close Control Panel

7.4 Installing Office MUI for Running KITS™ in Another Language

If you use non-English Windows, or choose another language from "***Regional and Language Options"***, you may receive an error message "Old format or invalid library …" when you start KITS™.

There are two scenarios which cause this message:-

1. English Windows. Non English Office.
2. Non English Windows.

There are various possible ways to fix this:

1. For English Language Installations of Windows / Office: Change the Windows operational language back to English:
    1. Go to ***[Start] / [settings] / [Control Panel] / [Regional and Language Options] / [Regional Options]*** tab.
    2. Set both the "standards and formats" drop down to a version of English.
    3. Then select the Languages tab, and set all "input language" details to a version of English. "Standards and formats" can be customised.
2. For non English installations of Office: The English Language Office MUI (Multilingual User Interface) must be installed. The Microsoft MUI is a separate Microsoft product that allows users to use Office in other languages.
3. Leave the computer in the non-English language, but install the relevant Microsoft Office English MUI.

8. KITS TOP LEVEL MENU LOCATION

Prior to Microsoft Office 2007 the KITS menus appeared in a row below the main Office Excel Menus. Refer **Figure 11** below.

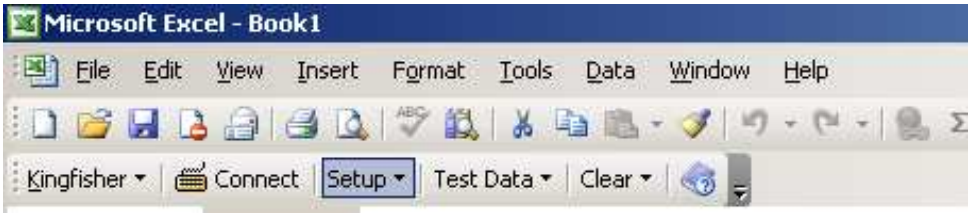


Figure 11, Original KITS Menu location

Starting with Office 2007 and above, Microsoft changed the rules.

With Office 2007 and above, the KITS menus are accessed via an 'Add-Ins' menu item added to the main Office Excel Menus. Once the ***[Add Ins]*** menu is clicked, the KITS menus become visible. Refer **Figure 12** below.

Figure 12, New KITS Menu location

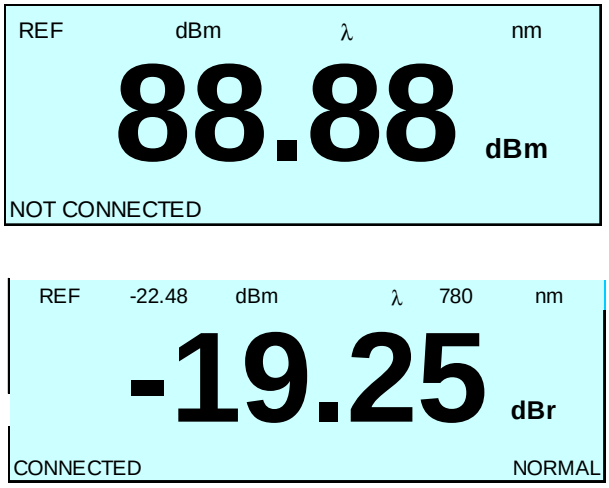
These Menus are discussed in detail in elsewhere within this manual.

9. STARTING KITS™ & CONNECTING AN INSTRUMENT

The software can be started with or without an instrument connected.

The KITS™ start up program permits test configuration before or after the worksheet is fully opened.

The procedure below assumes test circuit configuration is to be after the KITS™ worksheets are opened.

Step	Starting KITS™ & connecting an instrument
1	On your desktop, double click on ***[KITS Wizard]*** icon. Alternatively navigate via the Windows Start menu. e.g. ***[Start] -> [all Programs] -> [Kingfisher Kits] -> [Kits Wizard]***
2	Excel will start, with a screen "Welcome to KITS 4.14 "
3	Select ***[Finish]*** (Please Wait)
4	Select ***[Finish]*** (Please Wait)
5	The KITS™ splash screen will display.
6	KITS will open at the Meter Reading sheet. • With no instrument connected, the sceen will display 88.88 dBm and NOT CONNECTED. • With an instrument connected, the sceen will display the recive power level and CONNECTED.  **Figure 13, Meter reading start up screen**

If the KITS™ program does not load, refer to Section **7** on page **10** above.

If the instrument does not connect, firstly check that the instrument is turned On and that the computer interface cord is connected. If still unable to connect, refer to **Appendix B RS232 / USB Driver configuration & Installation** on page **64** below.

10. LIVE DATA WORKSHEET - MENUS

All loss testing data is entered into the live data sheet. Where an alternative report layout is required, this data can also be populated into the 'Loss Testing' worksheet or into a user designed report worksheet

The Live Data sheet has 6 pull down menus.

1) Kingfisher
2) Connect/Disconnect
3) Setup
4) Test Data
5) Clear
6) Jump to the User Manual

10.1 Kingfisher Menu

The Kingfisher sub menus are used to:-

- Open closed worksheets
- Createa new user designed worksheet
- Acess the inbuilt user manual
- Check on the installed KITS™ build version
- Link to the Kingfisher international web site.

10.1.1 Adding or removing a KITS™ Worksheet

Depending upon the application, not all of KITS'™ worksheets may be required.

A worksheet can be removed from the KITS™ workbook using standard Excel commands or not included in initial setup.

- A standard KITS™ worksheet can be restored to the workbook at any time. To do so, select ***[Kingfisher] -> [<Sheet name>]***.

Note: Because the Loss Testing sheet relied on the Live Data sheet for test data, it does not function properly without the Live Data sheet.

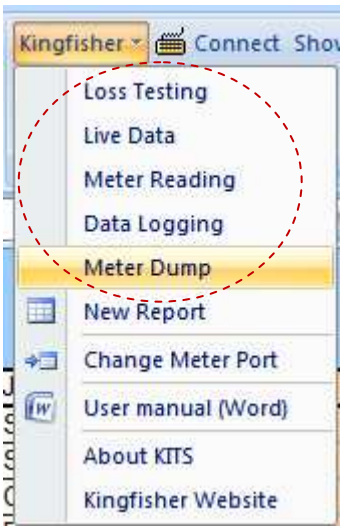


Figure 14, KITS worksheet restore

10.1.2 New Report

Used to design a custom report layout. This function is covered in Section 18.4

10.1.3 Change Meter Port

Users normally do not need to consider the meter port as KITS™ finds the port automatically on connection. The sequence is that KITS™ searches for an available USB port first, and then search for a RS232 port.

The ***Change Meter Port*** menu item is useful if multiple KITS™ applications are running in the same computer (e.g. in a laboratory situation). In this situation, the user may need to specify the COM port manually for a particular instance of KITS™.

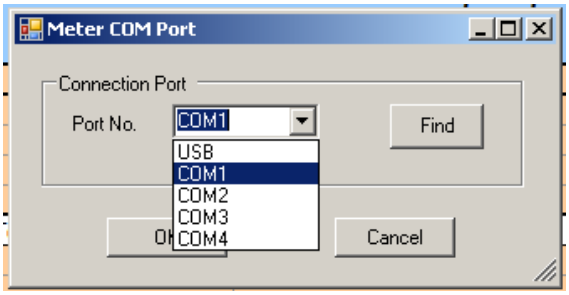


Figure 15, Select meter port

10.1.4 User Manual

This User Manual is also conatained within the KITS™ program as a Microsoft word document.

To acess the User Manual from within KITS™ navigate to:-

[Kingfisher] -> [User manual (Word)]

Alternativel the User Manual can be:-

1. located on your computer as detailed in 7.3.1 above.
2. downloaded from the Kingfisher International web site.
3. Accessed via the Main Menu symbol  which is located just to the right of the [Clear] Menu.

10.1.5 About KITS™

Displays the current KITS™ version number and release date.

This information is also displayed when the KITS™ program is loaded.

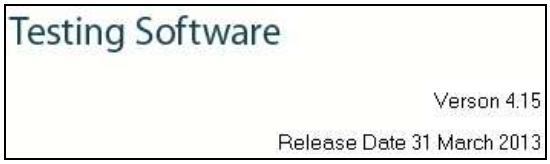


Figure 16, KITS build information

10.1.6 Kingfisher Web site

Links to the Kingfisher International web site.

10.2 Connect / Disconnect Menu

Connects or disconnects the instrument to KITS™.

10.3 Setup Menu

The Setup sub-menus are used to configure the Live Data worksheet for the required test paramaters. The sub-menu is divided into 4 groups as detailed below:-

a) Pass/Fail Setup, Test Setup & Terminal Names
b) Set Meter Reference, Protect Manual Data Entry & Set Autotest Wait Time
c) Hide Job Details, Show/Pas/Fail Setup & Hide Test Summary
d) Save as KITS Unlinked

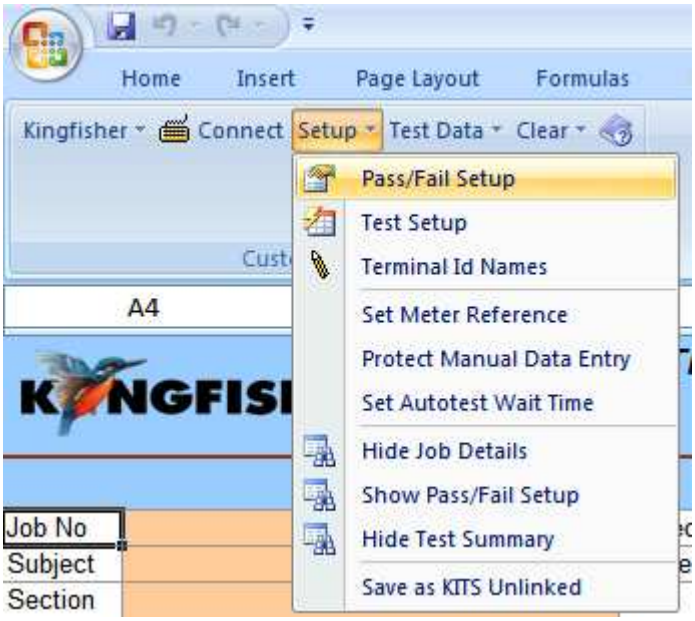


Figure 17, Live Data sheet –Setup sub-menu

10.3.1 Pass/Fail Setup

This Submenu is usually configured first. It used to configure the workbook for:-

- Standard selection.
  - If a local or international standard is selected, then various pass/fail parameters defined in the standards will be 'greyed out' to prevent alteration.
- Cable build details such as connector type, length, fibre count, number of splices etc.
- The number of test cords used in referencing the test instruments is also set here.
- Measurement uncertainty
- Pass/ fail/ marginal result based upon worst case or two-way average loss.

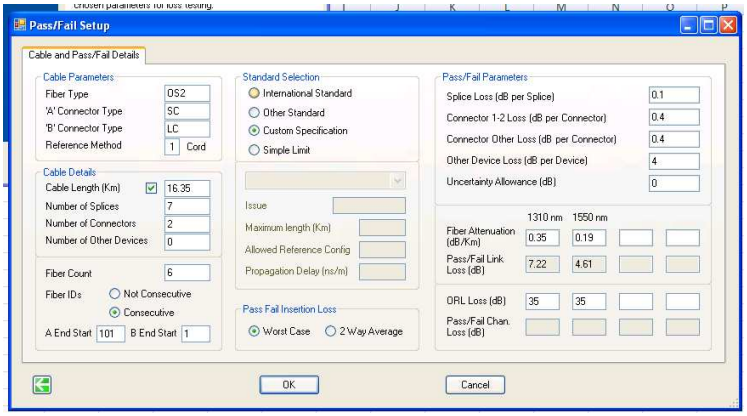


Figure 18, Pass / Fail Setup sub-menu

Note: Some standards restrict and or specify the allowable test cord referencing method. KITS will warn regarding this if necessary.

10.3.1.1 Definition: Pass / Fail / Marginal Result

The ISO & IEC standard organisations define the following.

Pass Result
Measured value which meets the specified requirement and where the absolute value of the difference between the measured value and the specified requirement is greater than the stated measurement uncertainty.

Fail Result
Measured value which fails to meet the specified requirement and where the absolute value of the difference between the measured value and the specified requirement is greater than the stated measurement uncertainty.

Marginal Result
Measured value which differs from the specified requirement, by an amount not exceeding the stated measurement uncertainty.

10.3.2 Test Setup

This Submenu is usually configured after the 'Pass/Fail' sub-menu. It is used to configure the workbook for:-

- Test direction – one way, two way with a source and meter or two way using a two way LTS.
- ORL measurement included or not.
- DUT 'end' at which the Power Meter is connected.
- Type of referencing used – Local or Remote.
- Wavelengths to be tested – maximum of 4.

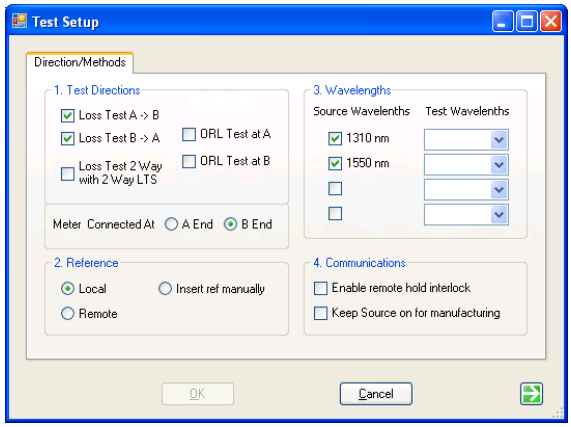


Figure 19, Test Setup sub-menu

Note: Whilst the 'Test Setup' and the 'Pass/Fail Setup' sub-menus can be configured in any order, it is recommended that when testing to a Standard, that the 'Pass/Fail Setup' sub-menu be configured first to minimise any interaction between them.

e.g. The standard may specify testing at two wavelengths, however the user may only be testing at one wavelength.

10.3.2.1 Local / Remote Referencing Definition

Whilst the terms 'Local' and 'Remote' referencing are used internationally, there is often some confusion.

Local:

- A Local Reference is performed when one power meter is used to measure both the Reference Level and the far end measurement.
- The two instruments that will be used to measure the DUT loss are together when referenced.
- Local Reference is commonly used in a situation where both ends of a system can be accessed readily by the one meter (for instance loop-back testing, or bench testing).
- With a Local Reference the meter can be configured to read the loss directly in dBr.

Remote:

- A Remote Reference is usually performed on a "long" link where it is inconvenient or impractical to use one power meter to measure the power at both the ends of the link.
- In a Remote Reference two power meters are used. One power meter is used to measure the Reference Level (e.g. the light source output power), and the other meter is used to measure the received level at the other end of the link.
- With a Remote Reference, a calculation must be made to determine the loss.

10.3.3 Terminal ID Names

This sub-menu is used to specify the names of the two ends to be tested:-

- the A & B end test location names e.g. Bamaga
- the number of characters to be used for abbreviation.
  e.g. 4 => BAMA, 3 => BAM

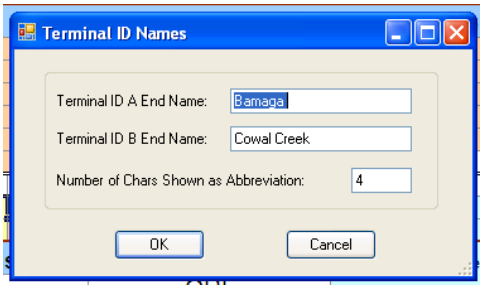


Figure 20, Terminal Identification (ID) sub-menu

10.3.4 Set Meter Reference

The ***Set Meter Reference*** sub-menu provides a convenient form to either:-

- Set the Reference Value, or
- Define the Reference Value.

The 'Set Meter Reference' popup is only available when an instrument is connected.

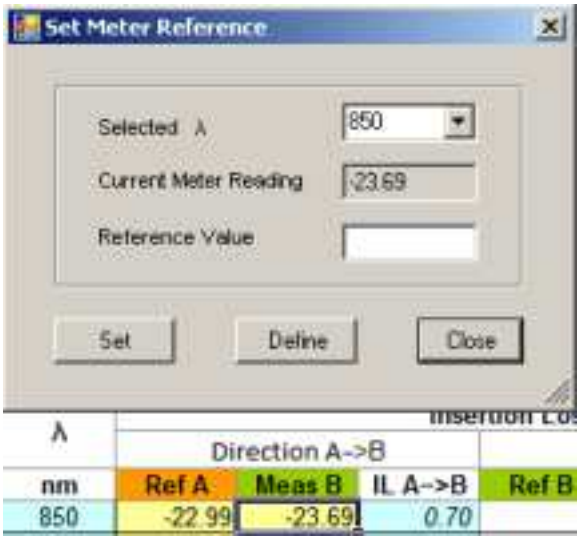


Figure 21, Set Meter Reference

The meter reference may also be set via the Meter Reading Worksheet. Refer Section **14** on page **47** below.

10.3.5 Protect Manual Data Entry

The ***Protect Manual Data Entry*** sub-menu can be used to protect the worksheet against unauthorised or accidental manual data modification; only data entered via AutoTest is permitted. The default setting is No protection.

To set up this option, a password in requested. Once the protection has been applied, the password can only be removed or changed after re-entering the original password. Don't lose your password!

- The Clear data sub-menu can still be used.
- This feature is password protected within the KITS workbook.
- This feature is removed in an Unlinked workbook. (Refer Section **10.3.10** on page **25** below)

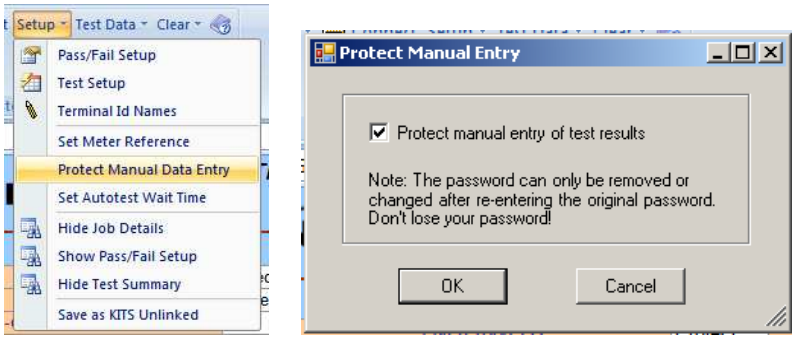


Figure 22, Prevent Manual data entry

10.3.6 Set Autotest Wait Time

The ***Set Autotest Wait Time*** sub-menu allows the user to choose the time interval to receive update of Autotest readings. Default is 10 seconds

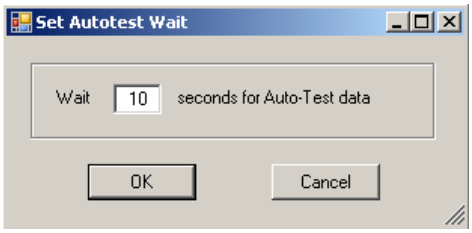


Figure 23, Autotest wait time

10.3.7 Job Details / Site Data Form

Project specific data is entered here.

The form can be toggled On & Off.

- On by Default.

Job Details / Site Data								
Job No	010/89-RL379	Project	Barkus upgrade	Date	31/05/2010			
Subject		Stage		Report/File No	Report-20100531			
Section		Duct	N/A	Channel/Perm Link	Link			
Circuit ID		Cable	F-BMAG-COWX-3005	Drawing No	FNQ/010/89			
Route	Direct buried	Sheath		Other				
Address "A"	R/T	Address "B"	37 Crawford Road, Cowal Creek					
Terminal ID		Sheath ID	Source type	Source S/N	Meter type	Meter S/N	CAL Y/N	Operator Name
"A"	Bamaga					11216	y	Sedgman
"B"	Cowal Creek							Crook

Figure 24, Job Details / Site Data Form

10.3.8 Pass / Fail Setup Form

This form shows the cable and optical test parameters.

The form can be toggled On & Off.

- Off by default.

Cable Parameters					Optical Parameters			
		Max allowed length	Km		Wavelength	1310	1550	1625
FC= Fiber Count	15	L = Fiber length	Km	16.35	F = Fiber attenuation, dB/Km	0.35	0.19	0.21
FT= Fiber Type	OS2	NS = Number of Splices		7	SL = Splice loss, dB	0.1	0.1	0.1
'A' connector type	SC APC	NC = Number of Connectors		2	CT = Connector 1-2 loss, dB	0.4	0.4	0.4
'B' Connector type	DIN PC				CL = Connector other loss, dB	0.4	0.4	0.4
Reference Method	1 Cord	ND = Number of other Devices		0	DL = Device insertion loss, dB	4	4	4
Reference Type	Remote	Test Direction		2-way	UA = Uncertainty allowance, dB	0	0	0
					Pass / Fail Link Loss, dB	7.22	4.61	4.93
Pass/Fail Calculation					Pass / Fail Channel Loss, dB			
Max Loss = (F*L) + (SL*NS) + (CT|CL*NC) + (DL*ND) + UA					Pass / Fail ORL Loss, dB	35.00	35.00	35.00

Figure 25, Cable & Optical test parameters

10.3.9 Test Summary Form

Provides test statistical analysis and a diagram of the test configuration.

The terminal identification (ID) name boxes are coloured orange or green when an instrument is connected, and grey when there is no connection.

The form can be toggled On & Off.

- On by default.

Statistical Analysis						
	Loss			ORL		
λ	Min	Mean	Max	Min	Mean	Max
1310	1.61	1.81	1.95	0.00	0.00	0.00
1550	1.34	1.42	1.48	0.00	0.00	0.00
1625	1.39	1.45	1.53	0.00	0.00	0.00

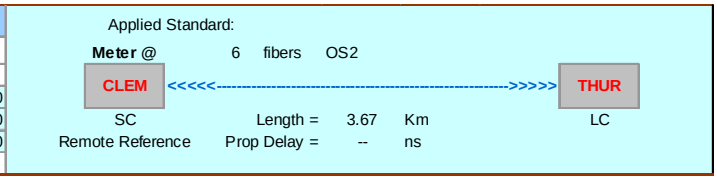
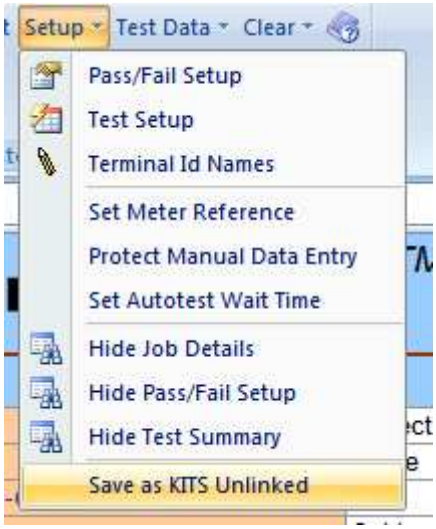


Figure 26, Test Statistics & Configuration drawing

10.3.10 Save as KITS Unlinked

Normally when a KITS™ workbook is opened, it will automatically start the KITS™ software. When required, the workbook can be Unlinked from the KITS™ software.

Once a KITS™ workbook is Unlinked, the file will open in Excel as per a normal workbook. Once performed, the action CANNOT be undone.

Step	Unlink KITS™ workbook
1	Open the workbook to be Unlinked • Ensure workbook display layout is as required. • Once Unlinked, the action CANNOT be undone
2	Select ***[Setup] -> [Save as KITS Unlinked]***  **Figure 27, Workbook linkage to KITS™**

10.4 Test Data Sub menu

This sub-menu is used to to manage save and load of the test data. There are 7 options, which are divided into 3 groups. .

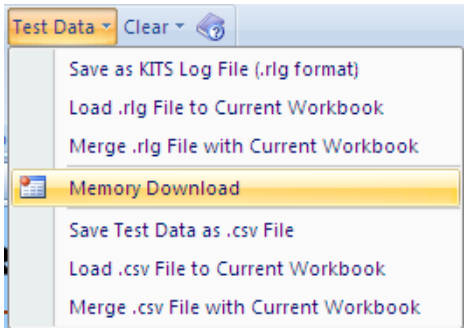


Figure 28, Test Data sub-menu

Group 1: Covers loading and merging files in the KITS™ rlg format

- Save as .rlg Log File:
- Load .rlg to Current Workbook:
- Merge .rlg with Current Workbook:

Group 2:

- Memory Download:

Group 3:

- Save as .csv File:
- Load .csv File to Current Workbook:
- Merge .csv file with Current Workbook

10.4.1 Load or Merge Log Data for Live Data Sheet

The **Load** command is used to import a saved rlg file into a worksheet. The Load function will overwrite all test data in the worksheet as well as the test parameters.

Step	Load rlg to Current Workbook
1	Select ***[Test Data]*** -> ***[Load .rlg File to Current Workbook]***
2	Select a log file (*.rlg) to open.
	Note: If the log file has a different set of wavelengths, fiber count, or fiber ID start number from the current workbook, a popup message will diplay advising the information to the user.

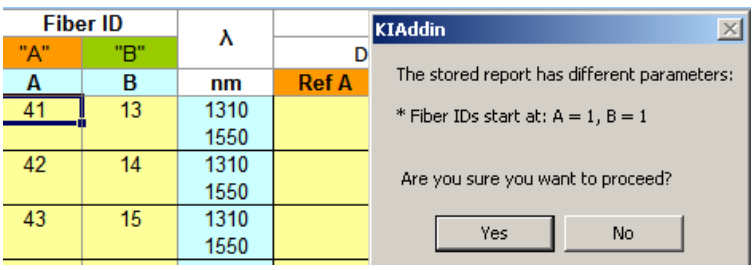


Figure 29, log file variation

Step	Load rlg to Current Workbook
3	The rlg file, is copied to the workbook, overwriting any existing data.

The **Merge** command is used to import a saved rlg to a worksheet with existing data.

Step	Merge rlg to Current Workbook
1	Select ***[Test Data] -> [Merge .rlg File with Current Workbook]***
2	Select a log file (*.rlg) to merge.
	Note 1: If the log file has a different set of wavelengths, fiber count, or fiber ID start number from the current workbook, a popup message will diplay advising the information to the user. Refer **Figure 29, log file variation** above.
3	From the pop-up box 'Report Merge' select the required merge options.
	Report data Mapping • Whether to load data straight A to A and B to B, or • swap A and B ends If the Swap option is chosen, then a selection must also be made from the Method area.
	Method • Whether or not to import the stored log file 'Job No' details or use the Current Report details. • Whether or not to import the stored Cable/Optical Parameters or use the Current Report details. • When importing the data the above data, Choose overwrite or only fill in when the cells of the current workbook are blank
	Merge Destination Selection • Select loss test data to be imported.

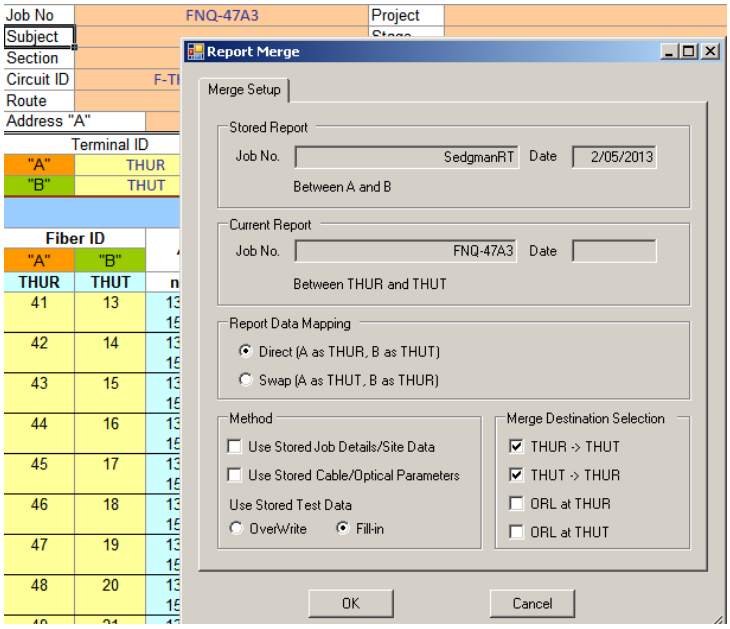


Figure 30, log file Merge

10.4.2 Memory Download

The instrument memory contents can be selectively dumped and mapped into the Live Data worksheet.

Memory download should not be performed with the instrument in Autotest mode.

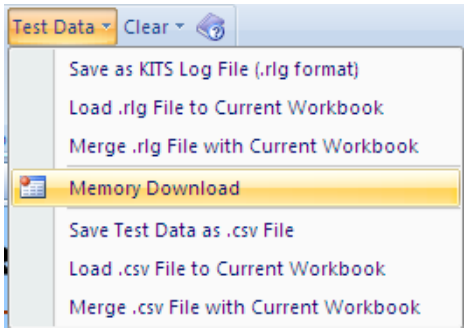
- Only wavelength data that matches the Live Data sheet configuration are downloaded into the Live Data worksheet.
- If unsure of the instrument memory contents, perform a Memory Dump using the 'Meter Dump' worksheet or 'Save Csv' program.

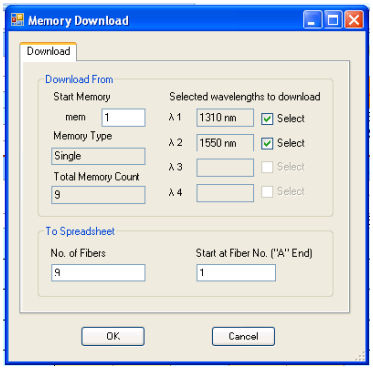
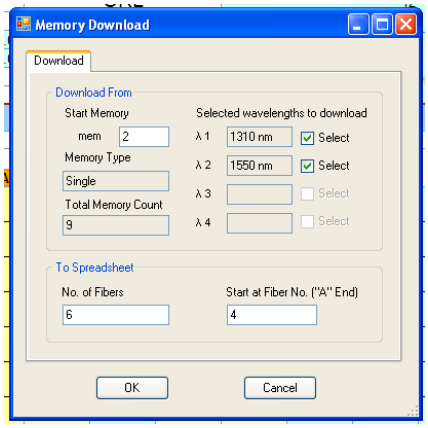
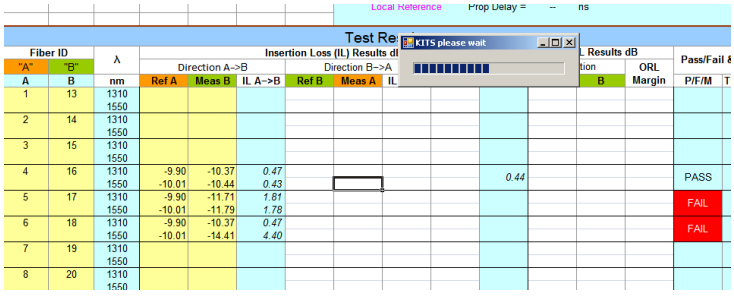
Download options to specify are:-

- Instrument 'start' memory location,
- Wavelengths to be downloaded,
- Spreadsheet 'start' fibre number,
- Spreadsheet number of memorylocations/ fibres to download.

The example below assumes:-

- Autotest
- use of a source and a meter at each end (or a simple Loss Test Set at each end.)
- Remote Referencing.
- Test direction configuration: Test A->B and then B->A.

Step	Memory download Procedure
1	Setup the Live Data worksheet to the required configuration. (Methodology discussed above)
2	Select ***[Test Data]*** -> ***[Memory Download]***  **Figure 31,**

Step	Memory download Procedure
3	The 'Memory Download' pop-up will open • If no pop-up: the meter is not connected.  **Figure 32, 'Memory Download' pop-up**
4	Select:- • Meter memory location to start downloading data from:- 'Start Memory' • Wavelengths to be downloaded:- 'Select wavelengths to download' • Number of memory locations / results to be downloaded:- 'No. Of Fibers' • Fibre number in KITS to begin the download at:- 'Start at Fiber No. ("A" End) For example; download from Memory location 2, data for 6 fibres starting at fibre 4. Refer **Figure 33** below.  **Figure 33, 'Memory Download' example**
5	Click ***[OK]*** to begin Memory Download. A 'KITS please wait' dialogue box will open during download, closing automatically when download complete.  **Figure 34, 'Memory Download' in progress**

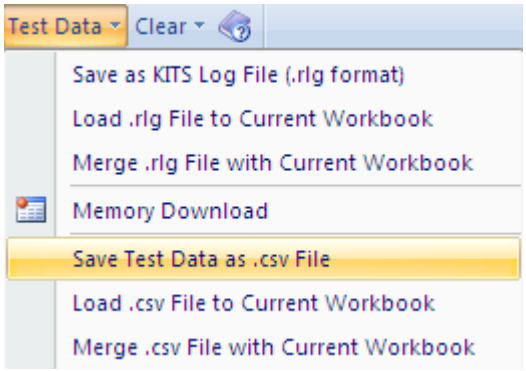
10.4.3 Save / Load / Merge csv File

Test data can be Saved, Loaded And Merged in CSV format.

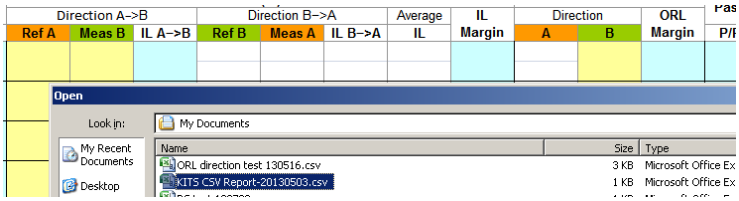
The default file name is of form *Report YYYYMMDD* e.g. Report 20130502

Operation of the .CSV Commands is the same as that for RLG files. Refer to the RLG procedure in Section 10.4.1 for more detailed information.

Save File:

Step	Save as CSV file
1	Select ***[Test Data] -> [Save Test Data as .csv File]***  **Figure 35, Save as CSV**
2	Enter file name. Select ***[Save]***

Load:

Step	Load CSV file
1	Select ***[Test Data] -> [Load .csv File to Current Workbook]***
2	Select required .csv file.  **Figure 36, Loading a .csv file**

Merge:

Step	Load CSV file
1	Select ***[Test Data] -> [Merge .csv File with Current Workbook]***
2	Select required .csv file.

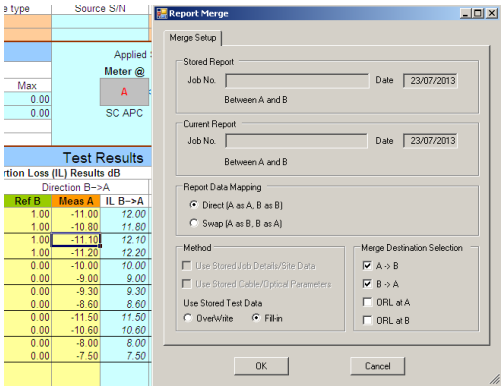
Step	Load CSV file
3	From the pop-up box select required Merge parameters. 

Figure 37, .CSV File Merge

10.5 Clear Submenu

The Clear Sub menu is used to clear all or part of the test data. Operation is self explanatory.

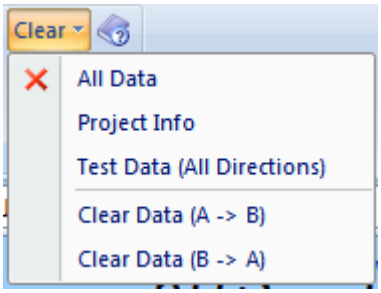


Figure 38, Clear sub menu

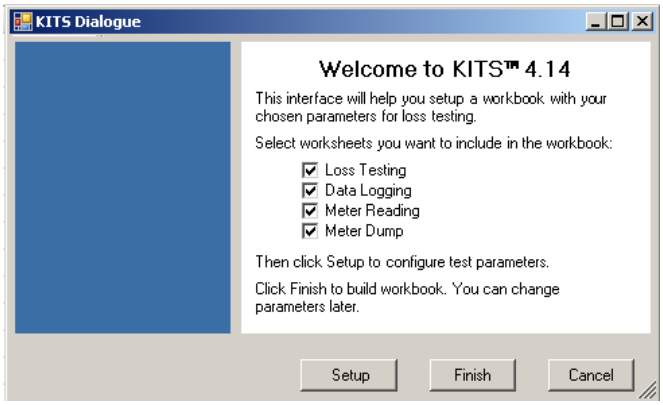
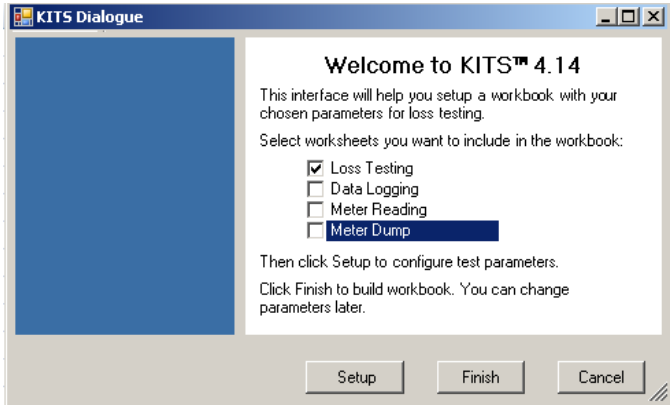
10.6 Jump to User Manual

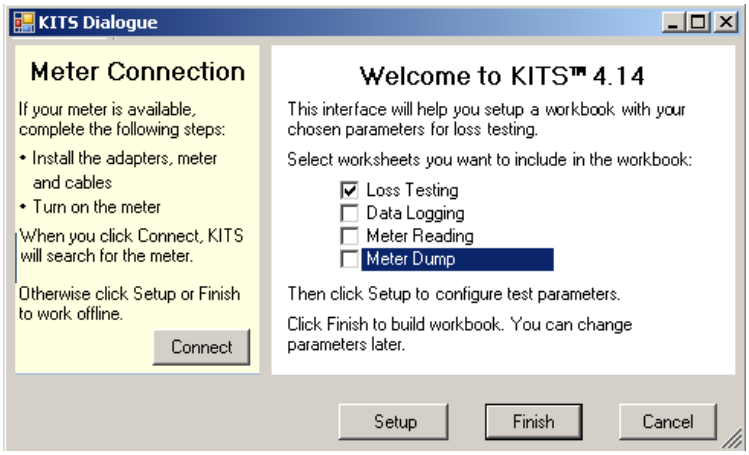
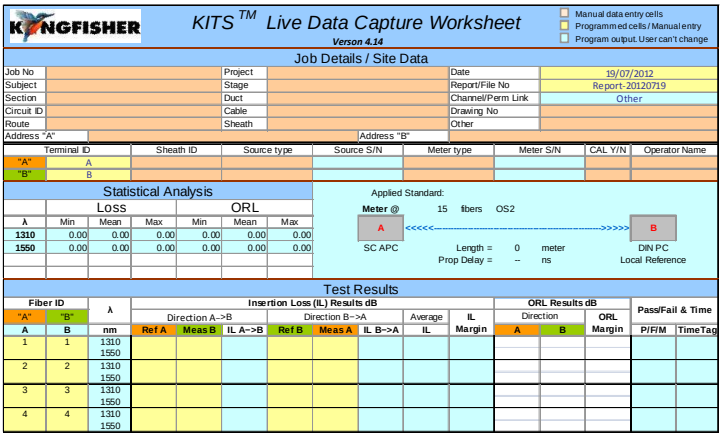
The User Manual can be accessed via symbol  which is located just to the right of the [Clear] Menu. Refer **Figure 38** above.

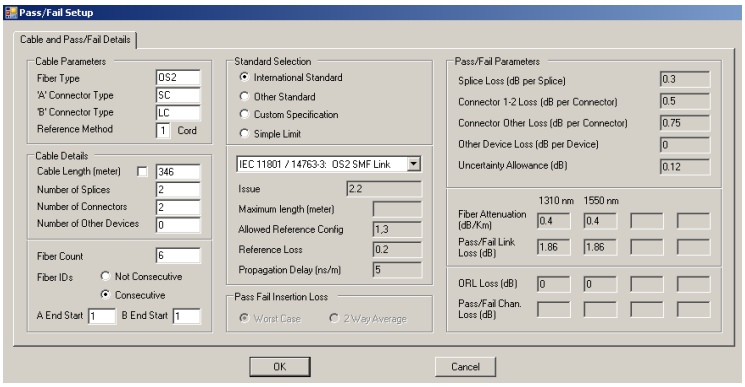
Alternate methods of accessing the User Manual are coverd in Section 10.1.4 above.

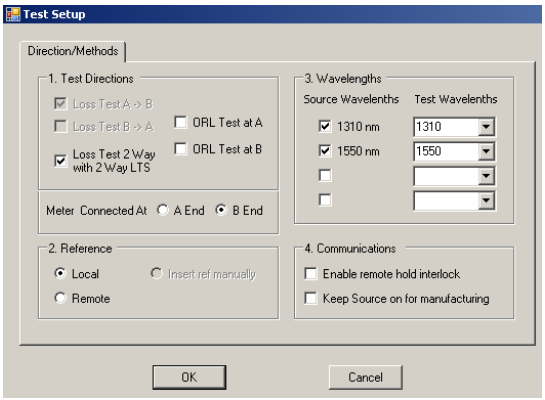
11. LIVE DATA – TYPICAL TEST CONFIGURATION

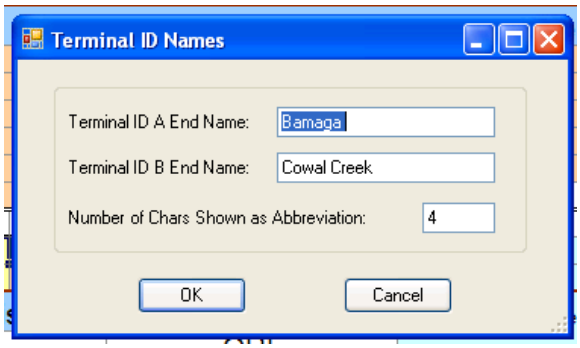
This section covers starting the KITS™ program and configuring it for loss testing.

Step	Configuration Procedure
1	On the computer screen, select the ***KITS™* Wizard** icon. The "Welcome to KITS™ 4.14" popup form will appear. Refer **Figure 39**.  **Figure 39, Start-up screen**
2	Tick the sheets to be included in the new workbook. For loss testing applications, it is normal to leave only 'Loss Testing' and perhaps 'Meter Dump' ticked. Refer **Figure 40**.  **Figure 40, Typical Loss Testing Selection** Click the ***[Finish]*** button when ready. ***Note:*** *For KITS 4.13 DO NOT USE the [setup] button as there is a minor bug, corrected in version 4.14.*

Step	Configuration Procedure
3	KITS™ scans available ports to find the attached meter. • If the meter cannot be found, a 'Meter Connection' dialogue box opens as shown in **Figure 41**. • If the meter cannot be found, check the connection, ensure the meter is on, and try again. • Alternatively, KITS™ can be used offline with manual data entry.  **Figure 41, Meter Not found or not connected.**
4	Click ***[Finish]*** to open the 'Live Data' worksheet. Refer Step **0** below. or Click ***[Setup]*** to enter the test configuration menu. Refer Step **0** below. ***Note:*** *KITS 4.13 minor bug:- do not choose [Setup], use the [Finish] option instead. Corrected in KITS 4.14*
5	Click the ***[Finish]*** button. KITS will open up into the Live Data sheet. • If an instrument is connected, the terminal identification (ID) name boxes will coloured orange or green. • If there is no instrument connected, both boxes will be grey as shown in **Figure 42** below.  **Figure 42, Live Data worksheet – pre-configuration**

Step	Configuration Procedure
	Configure all test parameters
6	First, enter the 'pass/fail setup' parameters:- • Press ***[Setup]*** • Press ***[Pass/Fail Setup]*** • Enter test parameters:- o Standard selection (should be selected first) *** o Cable parameters o Cable details o Fibre count o Fibre identification number *** One a standard is selected the following restrictions apply:- • Specifications that are set by the standard are greyed as they are not user changeable. • KITS will not allow a referencing method or length parameter at variance to the standard.  **Figure 43, Typical test parameters.** ***** Hint**: Access this sub-menu directly by clicking on the first fibre number in the yellow coloured cell on the left hand side of the 'test results' section.*

Step	Configuration Procedure
7	Next, enter the 'Test Setup' parameters:- • Press ***[Setup]*** • Press ***[Test Setup]*** 1./ select test direction • To test A->B tick the box 'Loss Test A->B' • To test in both directions using a source and a meter tick boxes 'Loss Test A->B' and 'Loss Test B->A' • If using a two way Loss Test Set (LTS) to test in both directions automatically, tick the box 'Loss Test 2 way with 2 way LTS' 2./ Enter the meter location e.g. • For testing A->B configure the meter at the B end. • To test B->A configure the meter at the A end. 3./ Configure for Local or Remote referencing. • For an explanation of Local & Remote Referencing, refer **Section** Error! Reference source not found**..** 4./ Choose wavelength(s) to be used for testing.  **Figure 44, Typical Test setup configuration** ***Note:*** *Whilst the 'Test Setup' and the 'Pass/Fail Setup' sub-menus can be configured in any order, it is recommended that the 'Pass/Fail Setup' sub-menu be configured first to minimise any interaction between them.*

Step	Configuration Procedure
8	By Default the two terminal ends are called 'A' and 'B' If required the terminals can be given individual names for identification purposes. To assign terminal names:- • Press ***[Setup]*** • Press ***[Terminal ID Names].*** • Assign names • Assign number of characters uaed for name abbreviation. • Press ***[OK]***  **Figure 45, Terminal Identification (ID) sub-menu**
9	The Workbook is now configured for testing. Loss testing cells that are configured to accept test data have a yellow background colour. Cells in which data is not required have no background colour.

12. LIVE DATA - TEST DATA ENTRY

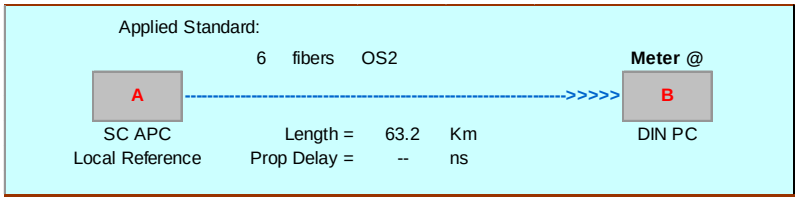
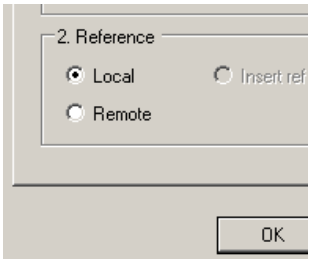
Test data can be input into the 'Live Data' sheet in 3 ways:-

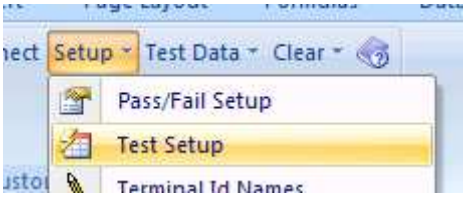
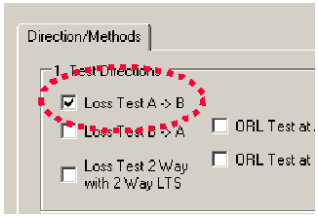
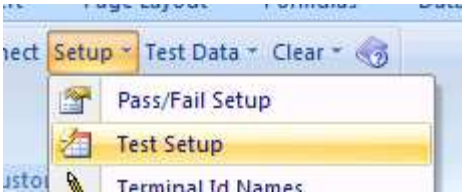
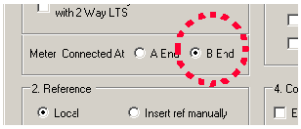
1. Manual Data entry.
2. By clicking on a cell whilst a meter is connected.
3. Memory download.

12.1.1 Manual Data Entry- local referencing, one-way test.

The example below assumes:-

- Local Referencing.
- Test direction configuration: Test A->B

Step	Manual data entry, one way, local reference Procedure
1	The test configuration drawing shows the current configuration including 'Meter' location.  **Figure 46, Test configuration**
2	If required, configure the 'reference type' in KITS so that test data will be correctly inserted. To Change:- • Select ***[Setup]*** -> ***[Test Setup]*** • Select 'Local' Reference. • Click On ***[OK]*** To Confirm  **Figure 47, KITS configured for Local Reference**

Step	Manual data entry, one way, local reference Procedure
3	If required, configure the test direction in KITS. In this example we are testing A->B To change:- • Select ***[Setup]*** -> ***[Test Setup]*** • Select Test Directions A->B. • Click on ***[OK]*** to confirm.   **Figure 48, KITS configured testing in the A->B direction**
4	If required, configure the meter location in KITS so that test data will be inserted in the correct direction. In this example we are testing A->B To change:- • Select ***[Setup]*** -> ***[Test Setup]*** • Select Meter connected at 'B End' • Click on ***[OK]*** to confirm.   **Figure 49, KITS configured Meter at 'B' for receiving A->B direction**
5	Enter the test data as required into the yellow columns/cells under the headings Ref A and Meas B. • **Ref A**: Transmitted power. Power level that is sent from the 'A' end to the 'B' end. • **Meas B** Received power. Power received at the 'B' end. **Figure 50, Local Reference, A->B**

Fiber ID		λ	Insertion Loss (IL) Results dB							
"A"	"B"		Direction A?>B			Direction B?>A			Average	IL Margin
A	B	nm	Ref A	Meas B	IL A?>B	Ref B	Meas A	IL B?>A	IL	
1	19	1310 1550								
2	20	1310 1550								
3	21	1310 1550								
4	22	1310 1550								

Step	Manual data entry, one way, local reference Procedure
6	When all required test data for a particular fibre has been entered, KITS will display the test result analysis. • Test parameter failures are shown in red and indicated as 'Fail' in the P/F column. • Marginal results are normally accepted as a pass. • Fibres that are re-tested are marked in the 'Time Tag' column.

Test Results

Fiber ID		λ	Insertion Loss (IL) Results dB								ORL Results dB			Pass/Fail & Time	
			Direction A?>B			Direction B?>A			Average	IL	Direction		ORL		
"A"	"B"														
A	B	nm	Ref A	Meas B	IL A?>B	Ref B	Meas A	IL B?>A	IL	Margin	A	B	Margin	P/F/M	TimeTag
1	19	1310	0.00	-24.00	24.00					0.12				MARGINAL	/01:37:15
		1550	0.50	-12.17	12.67										/01:37:53
2	20	1310	0.00	-25.10	25.10									FAIL	/01:39:45
		1550	0.50	-14.60	15.10										/01:40:19
3	21	1310	0.00	-9.89	9.89					3.34				PASS	/01:36:10
		1550	0.50	-10.17	10.67										/01:36:15
4	22	1310	0.00	-9.88	9.88					3.34				PASS	/01:36:18
		1550	0.50	-10.17	10.67										/01:36:19
5	23	1310	-9.88	-9.88	0.00					10.92				PASS	/01:36:20
		1550	-7.08	-10.17	3.09										/01:36:22

Figure 51, IL assessment

7	To produce a traditional style report. • Click on the worksheet ***[Loss Testing]*** o The test data will be automatically copied over from the 'Live Data' sheet.

Loss Testing Report
KITS Verson 4.13
KINGFISHER

Job No:	010/89-RL379	Project:	Barkus upgrade	Date:	31/05/2010
Subject:		Stage:		Report/File No:	Report-20100531
Section		Duct:	N/A	Comment:	Link
Circuit ID:		Cable:	F-BMAG-COWX-3005	Drawing No:	FNQ/010/89
Route:	Direct buried	Sheath:		Other:	

	Terminal ID	Sheath ID	Source S/N	Meter S/N	Operator Name
"A"	Bamaga			11216	Sedgman
"B"	Cowal Creek				Crook

Pass / Fail Value = (F*L) + (SL*NS) + (CT|CL*NC*) + (DL*ND) + UA

Fibre ID	1st Wavelength, nm	1310	2nd Wavelength, nm	1550	Pass/Fail	Min. margin (db)
	F = Fibre attenuation per Km, dB	0.35	F = Fibre attenuation per Km, dB	0.21		
	SL = Splice loss, dB	0.10	SL = Splice loss, dB	0.10		
	CT = Connector loss 1-2, dB	0.30	CT = Connector loss 1-2, dB	0.30		
	CL = Connector loss other, dB	0.30	CL = Connector loss other, dB	0.30		
	DL = Device insertion loss, dB	0.00	DL = Device insertion loss, dB	0.00		
	UA = Uncertainty allowance, dB	0.30	UA = Uncertainty allowance, dB	0.30		
	Pass / Fail Link Loss, dB	27.35	Pass / Fail Link Loss, dB	16.85		
	Pass / Fail ORL Loss, dB	50.00	Pass / Fail ORL Loss, dB	50.00		
	Minimum Average Loss (dB)	24.74	Minimum Average Loss (dB)	12.98		
	Maximum Average Loss (dB)	26.13	Maximum Average Loss (dB)	23.59		

		Ref level dBm		2nd value dBm		Link loss dB			ORL loss dB		Ref level dBm		2nd value dBm		Link loss dB			ORL loss dB			
"A"	"B"	A	B	A	B	A to B	B to A	Average	A	B	A	B	A	B	A to B	B to A	Average	A	B		
BB1	125	0.00	0.50	-25.30	-26.40	26.40	25.80	26.13			0.00	0.50	-23.25	-23.45	23.45	23.75	23.59			FAIL	
BB2	126	0.00	0.50	-25.26	-24.50	24.50	25.76	25.14			0.00	0.50	-13.21	-12.20	12.20	13.71	12.98			PASS	1.59
BB3	127	0.00	0.50	-25.25	-24.56	24.56	25.75	25.16			0.00	0.50	-13.14	-13.41	13.41	13.64	13.52			PASS	1.60
BB4	128	0.00	0.50	-24.98	-23.95	23.95	25.48	24.74			0.00	0.50	-13.04	-12.65	12.65	13.54	13.09			PASS	1.87

Figure 52, Traditional KITS report layout

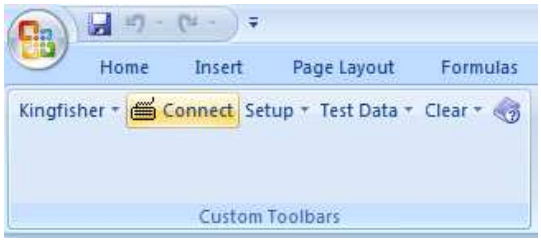
The user can select to display 1 or 2 wavelengths on this sheet. Click on the yellow 1st or 2nd wavelength cells to specify the wavelength(s) displayed.

12.1.2 One click entry - local referencing, one-way test.

This can be performed with the instruments acting under CW or Autotest.

The example below assumes:-

- Autotest
- use of a source and a meter at each end (or a simple Loss Test Set at each end.)
- **Local** Referencing.
- Test direction configuration: Test A->B.

Step	Autotest, one way, local reference Procedure
1	Configure KITS as per **Sections 12.1.1** and **12.1.2** above.
2	Connect instrument to the KITS software. If the instrument is turned On and connected to the computer when KITS starts, KITS will automatically connect
	Manual connection
3	Click on [Connect]  **Figure 53, Connect instrument to KITS software**
	Enter test data
4	In the KITS worksheet, click on 'Ref A' or 'Meas B' for the relevant fibre number. • Test data will be automatically extracted into KITS. • KITS will automatically analyse the results. • Pass/Fail assessment is based upon the Pass/Fail configuration. **Figure 54, Test data A-> B'** • Test parameter failures are shown in red and indicated as 'Fail' in the P/F column. • Marginal results are normally accepted as a pass. • Fibres that are re-tested are marked in the 'Time Tag' column. **Note 1:** KITS will not accept data clicked into the wrong cells. **Note 2:** test data wavelength must match KITS configuration.

Test Results

Fiber ID "A"	Fiber ID "B"	λ	Insertion Loss (IL) Results dB – Direction A?>B Ref A	Meas B	IL A?>B	Direction B?>A Ref B	Meas A	IL B?>A	Average IL	IL Margin	ORL Results dB – Direction A	B	ORL Margin	Pass/Fail & Time P/F/M	TimeTag
A	B	nm													
1	13	1310	-9.90	-10.31	0.41					0.40				PASS	2013/02:02:55
		1550	-10.01	-10.48	0.47										2013/02:02:39
2	14	1310	-9.90	-10.37	0.47					0.44				PASS	
		1550	-10.01	-10.44	0.43										
3	15	1310	-9.90	-10.78	0.88					-0.01				MARGINAL	2013/02:00:55
		1550	-10.01	-10.89	0.88										2013/02:01:19
4	16	1310	-9.90	-10.37	0.47									FAIL	
		1550	-10.01	-14.41	4.40										
5	17	1310	-9.90	-10.50	0.60									FAIL	
		1550	-10.01	-14.44	4.43										
6	18	1310	-9.90	-9.91	0.01					0.64				PASS	
		1550	-10.01	-10.24	0.23										

Step	Autotest, one way, local reference Procedure
	Alternate Test report layout
5	If desired the test results can be presented in the traditional style, read only 'Loss Testing' sheet. • Click on the worksheet ***[Loss Testing]*** The test data will be automatically copied over from the 'Live Data' sheet.

Pass / Fail Value = (F*L) + (SL*NS) + (CT|CL*NC*) + (DL*ND) + UA																							
Fibre ID	1st Wavelength, nm							1310		2nd Wavelength, nm									1550		Pass / Fail	Min. margin (db)	
	F = Fibre attenuation per Km, dB							0.35		F = Fibre attenuation per Km, dB									0.19				
	SL = Splice loss, dB							0.10		SL = Splice loss, dB									0.10				
	CT = Connector loss 1-2, dB							0.40		CT = Connector loss 1-2, dB									0.40				
	CL = Connector loss other, dB							0.40		CL = Connector loss other, dB									0.40				
	DL = Device insertion loss, dB							4.00		DL = Device insertion loss, dB									4.00				
	UA = Uncertainty allowance, dB							0.30		UA = Uncertainty allowance, dB									0.30				
	Pass / Fail Link Loss, dB							0.92		Pass / Fail Link Loss, dB									0.87				
	Pass / Fail ORL Loss, dB							35.00		Pass / Fail ORL Loss, dB									35.00				
	Minimum Average Loss (dB)							-0.01		Minimum Average Loss (dB)									-0.08				
	Maximum Average Loss (dB)							0.88		Maximum Average Loss (dB)									4.97				
		Ref level dBm		2nd value dBm		Link loss dB			ORL loss dB		Ref level dBm		2nd value dBm		Link loss dB				ORL loss dB				
"A"	"B"	A	B	A	B	A to B	B to A	Average	A	B	A	B	A	B	A to B	B to A	Average	A	B				
1	13	-9.90			-10.31	0.41					-10.01			-10.48	0.47						PASS	0.40	
2	14	-9.90			-10.37	0.47					-10.01			-10.44	0.43						PASS	0.44	
3	15	-9.90			-10.78	0.88					-10.01			-10.89	0.88						FAIL		
4	16	-9.90			-10.37	0.47					-10.01			-14.41	4.40						FAIL		
5	17	-9.90			-10.50	0.60					-10.01			-14.44	4.43						FAIL		
6	18	-9.90			-9.91	0.01					-10.01			-10.24	0.23						PASS	0.64	

Figure 55, Traditional KITS report layout – one way

The user can select to display 1 or 2 wavelengths on this sheet. Click on the yellow 1st or 2nd wavelength cells to specify the wavelength(s) displayed.

12.1.3 One click entry - local referencing, two-way test

This can be performed with two instruments acting under CW or Autotest.

The example below assumes:-

- Autotest
- use of a KI734x at each end
- **Local** Referencing.
- Test direction configuration: Test A<->B.

Step	Autotest, two way/bi-directional, local reference Procedure
1	Configure KITS as per **Sections 12.1.1** and **12.1.2** above for two-way / bidirectional testing.
2	Connect instrument to the KITS software. • If the instrument is turned on and connected to the computer when KITS starts, KITS will automatically connect
	Manual connection
3	Click on ***[Connect]***

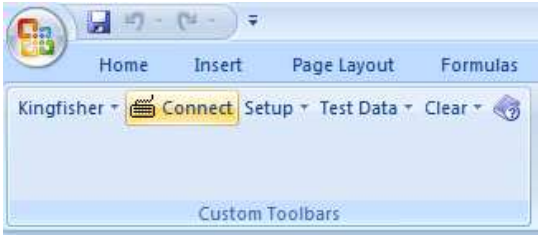
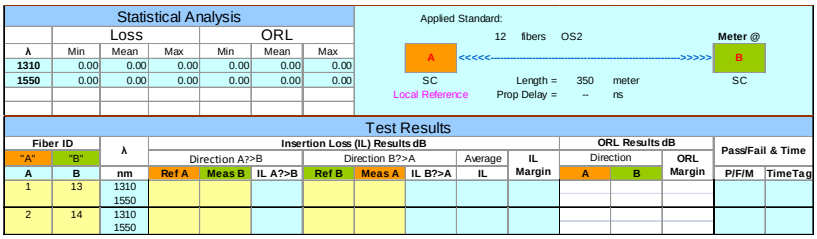


Figure 56, Connect instrument to KITS software

Step	Autotest, two way/bi-directional, local reference Procedure

4



Statistical Analysis

	Loss			ORL		
λ	Min	Mean	Max	Min	Mean	Max
1310	0.00	0.00	0.00	0.00	0.00	0.00
1550	0.00	0.00	0.00	0.00	0.00	0.00

Applied Standard: 12 fibers OS2 — Meter @ — A <<<<<---------->>>>> B — SC — Length = 350 meter — SC — Local Reference — Prop Delay = -- ns

Test Results

Fiber ID		λ	Insertion Loss (IL) Results dB								ORL Results dB			Pass/Fail & Time	
			Direction A?>B			Direction B?>A			Average	IL Margin	Direction		ORL Margin		
"A"	"B"														
A	B	nm	Ref A	Meas B	IL A?>B	Ref B	Meas A	IL B?>A	IL		A	B		P/F/M	TimeTag
1	13	1310													
		1550													
2	14	1310													
		1550													

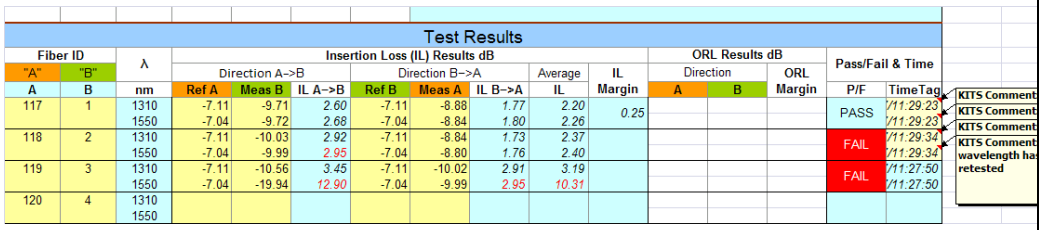
Figure 57, Instrument connected two-way configuration

Enter test data

5

In the KITS worksheet, click on 'Ref' or 'Meas' for the relevant fibre number.

- The test data will be automatically extracted into KITS.
- KITS will automatically analyse the results.
- Pass/Fail assessment is based upon the Pass/Fail configuration.



Test Results

Fiber ID		λ	Insertion Loss (IL) Results dB								ORL Results dB			Pass/Fail & Time		
			Direction A->B			Direction B->A			Average	IL Margin	Direction		ORL Margin			
"A"	"B"															
A	B	nm	Ref A	Meas B	IL A->B	Ref B	Meas A	IL B->A	IL		A	B		P/F	TimeTag	
117	1	1310	-7.11	-9.71	*2.60*	-7.11	-8.88	*1.77*	*2.20*	*0.25*				PASS	*'/11:29:23*	KITS Comment
		1550	-7.04	-9.72	*2.68*	-7.04	-8.84	*1.80*	*2.26*						*'/11:29:23*	KITS Comment
118	2	1310	-7.11	-10.03	*2.92*	-7.11	-8.84	*1.73*	*2.37*					FAIL	*'/11:29:34*	KITS Comment
		1550	-7.04	-9.99	*2.95*	-7.04	-8.80	*1.76*	*2.40*						*'/11:29:34*	KITS Comment: wavelength has retested
119	3	1310	-7.11	-10.56	*3.45*	-7.11	-10.02	*2.91*	*3.19*					FAIL	*'/11:27:50*	
		1550	-7.04	-19.94	*12.90*	-7.04	-9.99	*2.95*	*10.31*						*'/11:27:50*	
120	4	1310														
		1550														

Figure 58, Test data A<-> B'

- Test parameter failures are shown in red and indicated as 'Fail' in the P/F column.
- Marginal results are normally accepted as a pass.
- Fibres that are re-tested are marked in the 'Time Tag' column.

Note 1: KITS will not accept data clicked into the wrong cells.

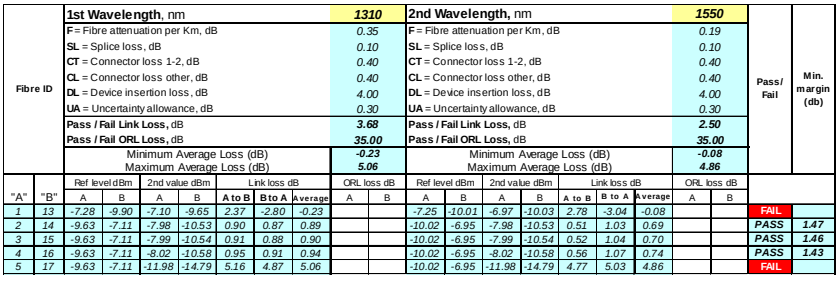
Note 2: test data wavelength must match KITS configuration.

Alternate test report layout

6

If desired the test results can be presented in the traditional style read only 'Loss Testing' sheet.

- Click on the worksheet ***[Loss Testing]***
- The test data will be automatically copied over from the 'Live Data' sheet.



Fibre ID		1st Wavelength, nm		1310	2nd Wavelength, nm		1550	Pass/ Fail	Min. margin (db)
		F = Fibre attenuation per Km, dB		0.35	F = Fibre attenuation per Km, dB		0.19		
		SL = Splice loss, dB		0.10	SL = Splice loss, dB		0.10		
		CT = Connector loss 1-2, dB		0.40	CT = Connector loss 1-2, dB		0.40		
		CL = Connector loss other, dB		0.40	CL = Connector loss other, dB		0.40		
		DL = Device insertion loss, dB		4.00	DL = Device insertion loss, dB		4.00		
		UA = Uncertainty allowance, dB		0.30	UA = Uncertainty allowance, dB		0.30		
		Pass / Fail Link Loss, dB		3.68	Pass / Fail Link Loss, dB		2.50		
		Pass / Fail ORL Loss, dB		35.00	Pass / Fail ORL Loss, dB		35.00		
		Minimum Average Loss (dB)		-0.23	Minimum Average Loss (dB)		-0.08		
		Maximum Average Loss (dB)		5.06	Maximum Average Loss (dB)		4.86		

		Ref level dBm		2nd value dBm		Link loss dB			ORL loss dB		Ref level dBm		2nd value dBm		Link loss dB			ORL loss dB			
"A"	"B"	A	B	A	B	A to B	B to A	Average	A	B	A	B	A	B	A to B	B to A	Average	A	B		
1	13	-7.28	-9.90	-7.10	-9.65	2.37	-2.80	-0.23			-7.25	-10.01	-6.97	-10.03	2.78	-3.04	-0.08			FAIL	
2	14	-9.63	-7.11	-7.98	-10.53	0.90	0.87	0.89			-10.02	-6.95	-7.98	-10.53	0.51	1.03	0.69			PASS	1.47
3	15	-9.63	-7.11	-7.99	-10.54	0.91	0.88	0.90			-10.02	-6.95	-7.99	-10.54	0.52	1.04	0.70			PASS	1.46
4	16	-9.63	-7.11	-8.02	-10.58	0.95	0.91	0.94			-10.02	-6.95	-8.02	-10.58	0.56	1.07	0.74			PASS	1.43
5	17	-9.63	-7.11	-11.98	-14.79	5.16	4.87	5.06			-10.02	-6.95	-11.98	-14.79	4.77	5.03	4.86			FAIL	

Figure 59, Traditional KITS report layout – two way

The user can select to display 1 or 2 wavelengths on this sheet. Click on the yellow 1st or 2nd wavelength cells to specify the wavelength(s) displayed

12.1.4 ORL Measurement

If you have an ORL meter then you may perform all the tests detailed above plus Optical Return Loss (ORL) measurement.

12.1.4.1 AutoTest ORL measurement

An ORL equipped Kingfisher instrument operating in two-way AutoTest mode automatically measures ORL.

Depending upon the test set up selected, KITS™ may already be configured for ORL measurement.

- When configured to record ORL, the ORL Results column(s), in the Live Data worksheet will be coloured yellow.

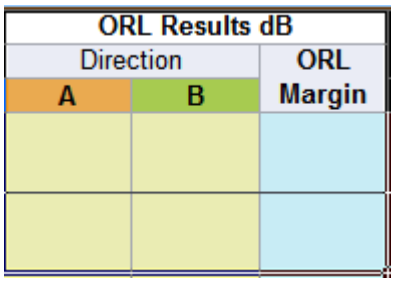
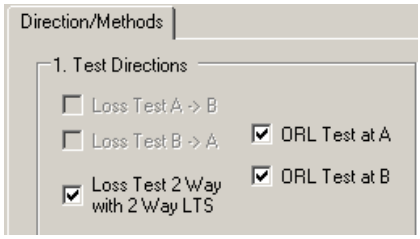


Figure 60, ORL configured

Configure KITS™ for 2-way ORL measurement as per below.

Step	Setup 2-Way ORL measurement
1	Select ***[Setup] ->[Test Setup].***
2	Select **[ORL Test at A]** and **[ORL Test at B]**  **Figure 61, Select 2-way ORL**
	Set up the KI734xx series 2-way ORL instruments into 2-way mode and connect to KITS
3	In the KITS worksheet, click on 'Ref', 'Meas' or ORL for the relevant fibre number. • The test data will be automatically extracted into KITS™.

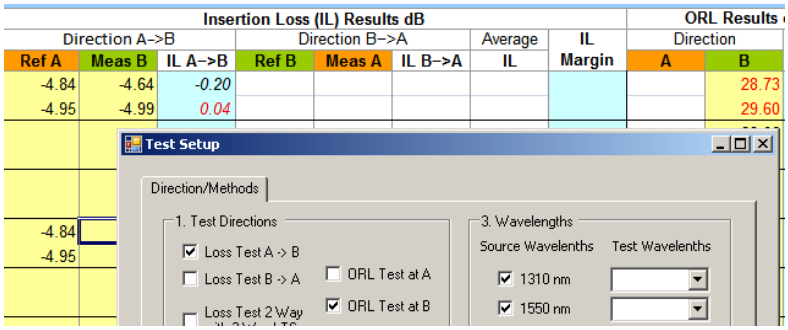
Note 1: If the circuit under test has a small insertion loss, the instrument's ORL isolation may not be sufficient for accurate ORL readings. In such situations, a manual measurement should be considered. Refer Section **12.1.4.2** below.

Note 2: The standard KI734xx series 2-way ORL meters have an ORL isolation of 25 dB. ORL isolation can be optionally increased to 50 dB at time of purchase.

12.1.4.2 Manual ORL measurement

Manual ORL measurement is usually performed with the Far End connected to an ORL terminator.

Configure KITS™ for ORL measurement as per below.

Step	Manual ORL measurement
1	Select ***[Setup] ->[Test Setup].***
2	Select [ORL Test at A] or [ORL Test at B] • To measure ORL as seen from the 'A' end select **[ORL Test at B]** • To measure ORL as seen from the 'B' end select **[ORL Test at A]**  **Figure 62, Select ORL location**
3	If necessary, terminate the Far End in an ORL termination.
4	Measure: In the KITS worksheet, click on 'Ref', 'Meas' or ORL for the relevant fibre number and wavelength. • The test data will be automatically extracted into KITS™.

13. LOSS TESTING WORKSHEET

The Loss Testing worksheet provides test report data in the traditional KITS™ 3.xx layout format and should be seen as an alternative report layout to the 'Live Data worksheet'.

- All data in the Loss Testing worksheet is loaded from the 'Live Data worksheet'.
- The Lost testing sheet can display 1 or 2 wavelengths.
- Pass- fail annalyisis results are Pass or Fail. TheMarginal result is not implemented in this worksheet.
- The Job, Cable and Formulae sections of the worksheet can be optionally displayed or hidden during testing, saving or printing.

Show/Hide Job Details

Show/Hide Cable Details

Show/Hide Formula Section

Test Data

Loss Testing Report

KITS Verson 4.13

KINGFISHER

Job No:	8418	Project:	WR-2ULT-033	Date:	21/12/2011
Subject:		Stage:		Report/File No	Report-20111221
Section		Duct:		Comment:	Other
Circuit ID:		Cable:	2ULT-0000-IFS-039	Drawing No:	
Route:		Sheath:		Other:	

	Terminal ID	Sheath ID	Source S/N	Meter S/N	Operator Name
"A"	7/3/Q/RU14/49-72			13820	dom
"B"	7/4/N/RU24/13-36		13819		

Pass / Fail Value = (F*L) + (SL*NS) + (CT|CL*NC*) + (DL*ND) + UA

Number of Fibres:	24			
L = Fibre length, meter	936	**NS** = Number of splices:	3	
NC = Number of connectors	2	**ND** = number of devices:	0	
Test Direction	2-way	Number of Wavelengths	2	

Fibre ID	**1st Wavelength**, nm	1310	**2nd Wavelength,** nm	1625	Pass/ Fail	Min. margin (db)
	F = Fibre attenuation per Km, dB	0.35	**F** = Fibre attenuation per Km, dB	0.21		
	SL = Splice loss, dB	0.10	**SL** = Splice loss, dB	0.10		
	CT = Connector loss 1-2, dB	0.30	**CT** = Connector loss 1-2, dB	0.30		
	CL = Connector loss other, dB	0.30	**CL** = Connector loss other, dB	0.30		
	DL = Device insertion loss, dB	0.00	**DL** = Device insertion loss, dB	0.00		
	UA = Uncertainty allowance, dB	0.17	**UA** = Uncertainty allowance, dB	0.17		
	Pass / Fail Link Loss, dB	**0.63**	**Pass / Fail Link Loss,** dB	**0.50**		
	Pass / Fail ORL Loss, dB	**0.00**	**Pass / Fail ORL Loss,** dB	**0.00**		
	Minimum Average Loss (dB)	**-0.56**	Minimum Average Loss (dB)	**-0.43**		
	Maximum Average Loss (dB)	**0.18**	Maximum Average Loss (dB)	**0.17**		

		Ref level dBm		2nd value dBm		Link loss dB			ORL loss dB		Ref level dBm		2nd value dBm		Link loss dB			ORL loss dB			
"A"	"B"	A	B	A	B	A to B	B to A	Average	A	B	A	B	A	B	A to B	B to A	Average	A	B		
49	13	-8.81	-10.90	-9.65	-9.34	0.53	-1.25	-0.48			-9.63	-10.55	-9.72	-9.74	0.11	-0.83	-0.38			PASS	0.10
50	14	-8.81	-10.90	-10.32	-9.99	1.18	-0.58	0.18			-9.63	-10.55	-10.05	-10.04	0.41	-0.50	-0.07			FAIL	
51	15	-8.81	-10.90	-9.76	-9.52	0.71	-1.14	-0.34			-9.63	-10.55	-9.86	-9.82	0.19	-0.69	-0.27			FAIL	
52	16	-8.81	-10.90	-9.63	-9.32	0.51	-1.27	-0.50			-9.63	-10.55	-9.92	-9.70	0.07	-0.63	-0.30			PASS	0.12

Figure 63, Loss Testing Worksheet – all fields displayed

After data is entered in the Live Data sheet, select the Loss Testing tab (or click ***Kingfisher / Loss testing***) to view this date in the Loss Testing sheet format.

The data cells are filled in automatically using Excel formulae. By default, it uses the data of the first and second wavelength. Different wavelengths can be selected by clicking on either the 1st or 2nd wavelength cells (with yellow background).

The three show/hide menu items under ***Show/Hide*** **Details** derermine which sheet sections to view and print:

- ***Show/Hide Job Details*** toggles in between showing or hiding the Job Details / Site Data section.
- ***Show/Hide Cable Details*** toggles in between showing or hiding the cable parameters.
- ***Show/Hide Formula Section*** toggles in between showing or hiding the pass/fail formula parameters.
    - To produce a **standards compliant report** all sections should be displayed prior to printing.

14. METER READING WORKSHEET

The meter reading work sheet provides basic meter functions and is usefull for confirming instrument connection, and where a large display is required.

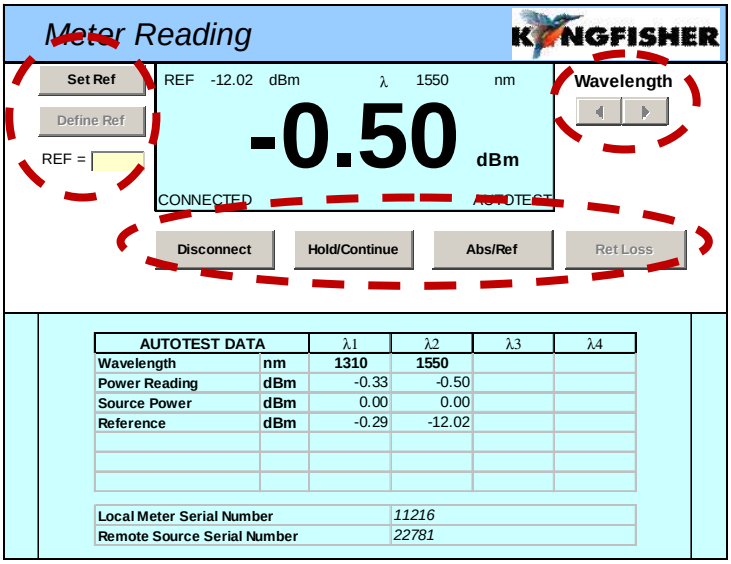
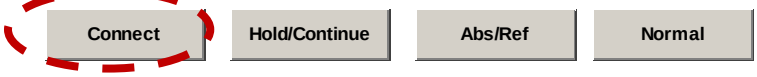
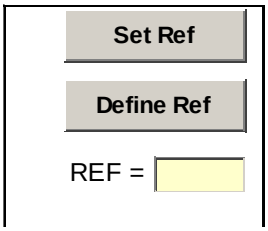
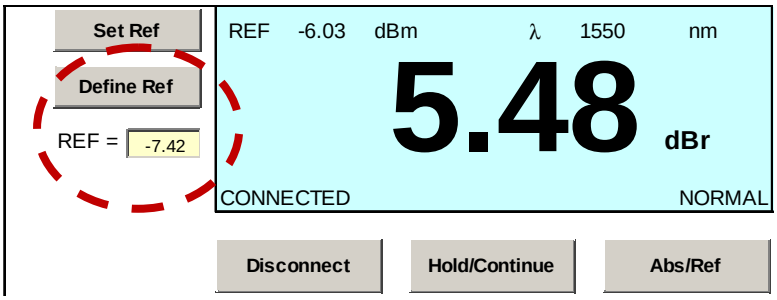


Figure 64, Meter Display

Operations can be as follow (most of these operations directly control the meter):

Step	Meter Display Functions
	Connect / Disconnect
1	To connect / disconnect the meter click the [***Connect]*** / [***Dissconnect]*** button.  **Figure 65, Main function buttons** When the instrument is 'Connected', 'CONNECTED' will show on the display. Refer **Figure 64** above.
	Display Hold
2	To stop / resume the display update, click the [***Hold/Continue]*** button. • When in 'Hold' mode, 'HOLD' will show on the display.
	Change wavelength (λ)
3	To change the wavelength display, click the ***[◄]*** or ***[►]*** up/down button. • This feature not available when source is in Autotest mode. • In Autotest mode, the display shows live data.
	Select Absolute / Relative mode
4	To toggle absolute / relative modes, click the ***[Abs/Ref]*** button.
	Show ORL
5	To toggle Return Loss / Normal, click the [***Ret Loss] / [Normal]*** button. • Applicable to instruments that measure ORL

Step	Meter Display Functions
	Set or Define Reference **
6	To set the Reference, click ***[Set Ref]***. • This feature not available in Autotest mode. • This is a per wavelength setting.  **Figure 66, Set Reference**
	Set a user specified Reference **
7	Enter the user specified reference the textbox ***[Ref=]*** and then click ***[Define Ref]*** • This feature not available when source is in Autotest mode. • This is a per wavelength setting.  **Figure 67, User specified Reference**

** The Reference value can also be Set or Defined via the Live Data worksheet. Refer Section **10.3.4** on page **22** above.

15. DATA LOGGING WORKSHEET

The Data Logging sheet supports data logging wheather the meter is in Power Meter, one-way or two-way Autotest mode.

The following statistical information is recorded:-

- max,
- min,
- mean,
- standard deviation and
- current reading.

15.1 Automatic Data Logging

Automatic data logging allows the user to specify:-

- the meter wavelength,
- the size of the log,
- the log time interval and
- Absolute or Relative mode,

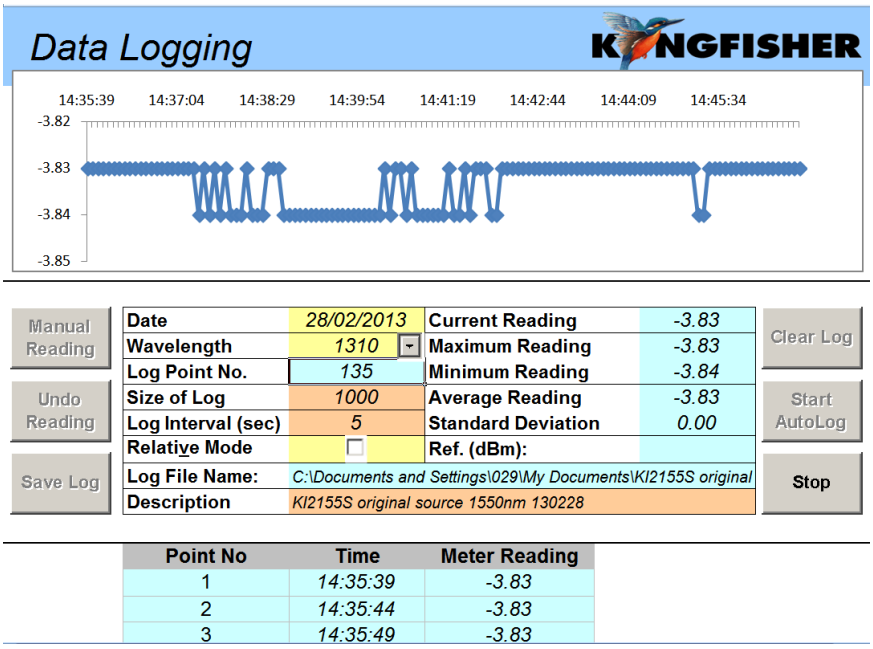


Figure 68, Data logging

During the data logging, each data point is automatically written to the specified log file, minimising data loss in case of a process interruption.

The source should be in CW mode, however data loggingmaybe possible in AutoTest mode.

Use of source in AutoTest mode:

Depending upon sample interval and computer speed, the reading may become unreliable if the instrument is in Autotest mode. Autotest samples intervals greater than 5 seconds are generally OK.

Caution: If sampling with the source in Autotest mode is required, trial test parameters before committing to the test.

Step	Automatic data logging Procedure
1	Select the ***Data Logging*** worksheet.
2	To select the wavelength, use the arrow buttons next to [***Wavelength]***. **Note:** Meter must be connected for this function.
3	Define [***Size of log]***
4	Define [***Log Interva]l (sec).***
5	If required, select [***Relative Mode***]
6	If required, add a [***Description***]
7	To clear existing data, select [***Clear Log]***
8	To start logging, click ***[Start Autolog]*** and enter file name in the dialog box.. • Consider using the '***Description***' from Step 6 above for the file name.
9	To stop or halt the data logging before it is completed, click ***[Stop].*** To restart the data logging, click ***[Continue].***

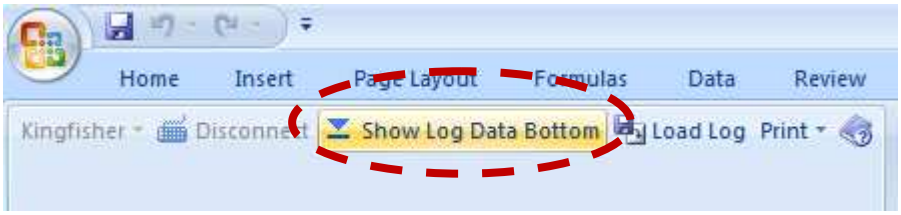
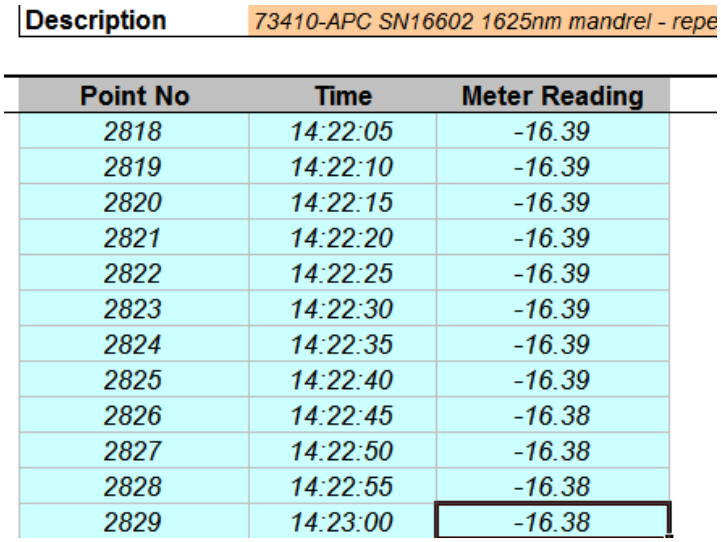
15.2 Manual Data Logging

Data is stored upon uer command.

Step	Manual data logging Procedure
1	Select the ***Data Logging*** worksheet.
2	To clear existing data, select the ***[Clear Log]*** button
3	To set the wavelength, use the arrow buttons next to ***[Wavelength***] **Note:** Meter must be connected for this function.
4	If required, select ***[Relative Mode***]
5	If required add a ***[Description***]
6	For each click of ***[Manual Reading]***, a data point is logged. The data point index and the size of the log is automatically incremented.
7	To undo the last reading, select ***[Undo Reading]***. This decreases the data point index, but not the size of log value.
8	To save the data log, click the ***[Save Log]*** button and enter file name in the dialog box.

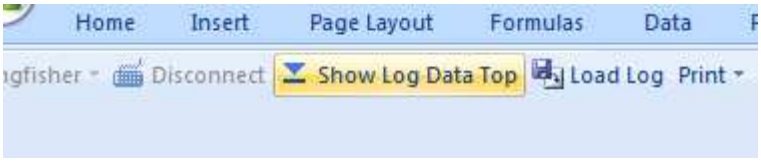
15.3 Viewing data whilst logging

Whilst the data is being logged, the default is to show the earliest (top of the spreadsheet) readings. If required the user can display the current readings. (bottom of the spreadsheet)

Step	View data options whilst logging
1.	To show current data readings, select ***[Show Log Data Bottom]***  **Figure 69, Select bottom data display**
2.	

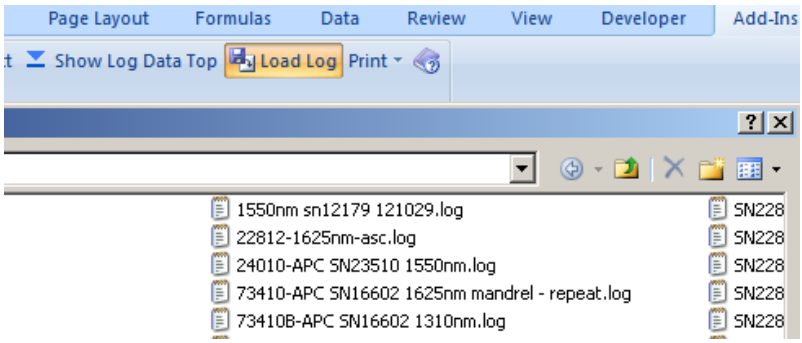
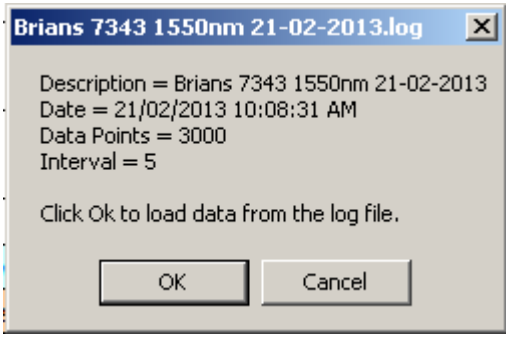
Point No	Time	Meter Reading
2818	14:22:05	-16.39
2819	14:22:10	-16.39
2820	14:22:15	-16.39
2821	14:22:20	-16.39
2822	14:22:25	-16.39
2823	14:22:30	-16.39
2824	14:22:35	-16.39
2825	14:22:40	-16.39
2826	14:22:45	-16.38
2827	14:22:50	-16.38
2828	14:22:55	-16.38
2829	14:23:00	-16.38

Figure 70, Current logging data

3.	To revert to the top of the data readings, select ***[Show Log Data Top]***  **Figure 71, Select top data display**

15.4 Loading saved log files

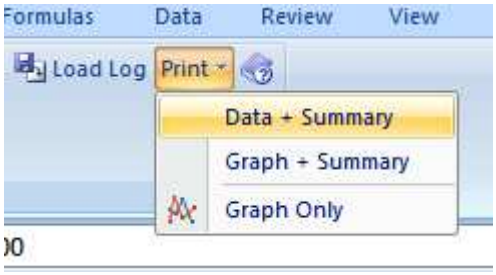
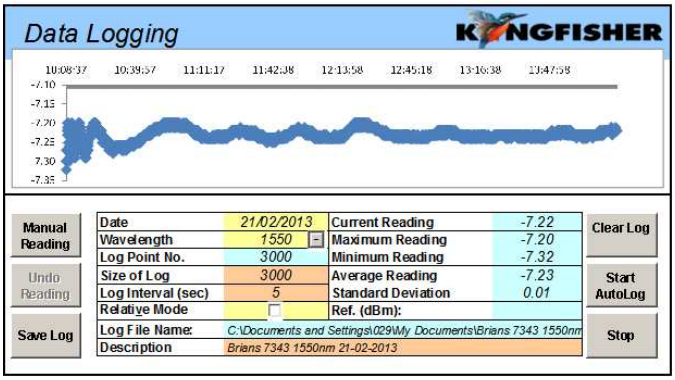
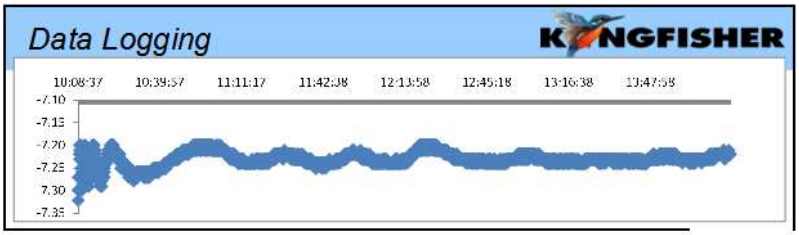
A saved log file can loaded into the spreadsheet.

Step	Loading saved Log file
1.	Ensure no instrument is connected to KITS.
2.	Select ***[Load Log]***  **Figure 72, Select Log file to load**
3.	A pop up dialogue box provides information about the selected Log file. Select ***[OK]*** to load or [Cancel] to back out.  **Figure 73, Confirm log file to load** **Note:** very large Log files may take a while to load. Load completion, is easily confirmed by the presence of the graph.

15.5 Printing log files

Besides the usual Windows print options, the KITS™ Data Logging worksheet has three inbuilt print options:-

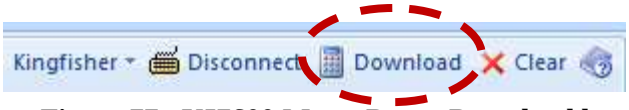
- Data + Summary
- Graph + Summary
- Graph only

Step	Printing Log files
1.	Load the Log file to be printed. **Note:** very large Log files may take a while to load. Load completion, is easily confirmed by the presence of the graph.
2.	To print **Data + Summary** select ***[Print]*** , then select ***[Data + Summary]***  **Figure 74, Data Log print options**
3	To print Graph **+ Summary** select ***[Print]*** , then select ***[Graph + Summary]***  **Figure 75, Graph + Summary**
4.	To print the **Graph** only select ***[Print]*** , then select ***[Graph Only]***  **Figure 76, Graph Only**

16. METER DUMP WORKSHEET

The Meter Dump worksheet provides a simple and convenient way to download and view the loss test data stored in an instrument.

Unlike the Live Data sheet where only the memory readings that match the selected wavelengths are downloaded, the Meter Dump sheet downloads all data from meter memory. No analysis is performed.

Step	Meter Dump
1.	Select ***[Download]***  **Figure 77, KI7600 Meter Dump Download button**
2.	All memory cells are downloaded to the worksheet.

Data downloaded from S/N 11216, Date/Time 130228/03:04:31

Fiber	Lambda	Reading	Ref	ORL	Remote Reading	Remote Ref	Remote ORL	Remote S/N
1	1550 nm	-4.06	-12.02					
2	1550 nm	-4.07	-12.02					
3	1550 nm	-8.31	-12.02					
4	1550 nm	-12.01	-12.02					
5	1550 nm	-7.20	-12.02					
6	1550 nm	-4.09	-12.02					

Figure 78, KI7600 Power Meter Dump

Data downloaded from S/N 23143, Date/Time 130228/03:13:56

Fiber	Date	Time	Type	ID Tag	Remote S/N	WL	Power	Ref	Nom
1	1/01/12	12:03	Meter	TAGA011	0	1550 nm	-4.11	-7.78	0.00
2	1/01/12	12:03	Meter	TAGA012	0	1550 nm	-7.99	-7.78	0.00
3	1/01/12	12:03	Meter	TAGA013	0	1550 nm	-6.39	-7.78	0.00
4	1/01/12	12:03	Meter	TAGA014	0	1550 nm	-17.17	-7.78	0.00
5	1/01/12	12:03	Meter	TAGA015	0	1550 nm	-4.12	-7.78	0.00

Figure 79, KI2600 Power Meter Dump

3	To Clear the data select ***[Clear]***.

17. EXTRACT MEMORY TO CSV

KITS™ has an option to download data from an instrument memory directly into a text file. This feature is idependant of Microsoft Office.

Step	Extract to CSV
1.	Connect the instrument to the RS232 or USB port of the PC.
2.	Click ***[Start] -> [Programs] -> [Kingfisher Kits] -> [Save Csv]***
3.	In the Open box specify a filename and choose the location to save the file.
4.	Click the Close button and the data will be saved to this text file. • When the instrument does not show the RS232/USB symbol the download is complete.

Fiber	Lambda	Reading	Ref	ORL	Remote Reading	Remote Ref	Remote ORL	Remote S/N
1	0nm							
2	1310nm	-7.37	-7.63	-28.33	-7.44	-7.28	-27.42	9288
2	1550nm	-7.56	-4.17	-29.4	-7.17	-7.13	-28.75	9288
3	1310nm	-31.35	-7.63	-55.53	-31.65	-7.28	-28.32	9288
3	1550nm	-9.48	-4.17	-30.38	-35.54	-7.13	-29.3	9288
4	1310nm	-8.66	-7.63					

Figure 80, Memory extract via 'Save Csv'

18. CUSTOMISATION

Being Excel based, KITS™ offers a number of modification options.

18.1 Renaming worksheets

This is as standard Windows function. A worksheet name can be changed to any other text accepted by Excel. KITS™ remembers the new sheet name when the workbook is saved.

18.2 Modifying the Live Data & Loss Testing worksheets

Many fields in the Live Data & Loss Testing worksheets can be modified. There are two options for performing this being:-

1. Modifying the Master Layout template or
2. Modifying an open or existing KITS™ workbook.

KINGFISHER aec

KITS™ Live captura de datos hoja de cálculo

Version 4.12

Manual data entry cells
Programmed cells / Manual entry
Program output. User can't change

Job Details / Site Data - Detalles de Empleo / datos del sitio

Trabajo No		Project		Date	12/08/2008
Tema		Etapa		Report/File No	Report-20080812
Sección		Duct		Channel/Perm Link	Other
Circuit ID		Cable		Drawing No	
Ruta		Sheath		Other	
Dirección "A"			Dirección "B"		

Terminal ID		Sheath ID	Fuente Tipo	Source - Fuente S/N	Tipo Meter	Meter S/N	CAL Y/N	Nombre del operador
"A"	AEC							
"B"	Kingfisher							

Cable Parameters - Cable Parámetros					Optical Parameters - Parámetros de fibra óptica		
		Max allowed length	Km		Wavelength	1310	1550
FC= Fiber Count	6	**L** = Fiber length	Km	3.41	**F** = Fiber attenuation, dB/Km	0.35	0.19
FT= Fiber Type	SMF	**NS** = Number of Splices		4	**SL** = Splice loss, dB	0.1	0.1
'A' connector type	SCPC	**NC** = Number of Connectors		2	**CT** = Connector 1-2 loss, dB	0.4	0.4
'B' Connector type	SCPC				**CL** = Connector other loss, dB	0.4	0.4
Método de referencia	1 Cord	**ND** = Number of other Devices		0	**DL** = Device insertion loss, dB	4	4
Tipo de referencia	Remote	Prueba de Dirección		2-way	**UA** = Uncertainty allowance, dB	0	0
					Pass / Fail Link Loss, dB	2.39	1.85
Pass/Fail Calculation - Superado / No cálculo					Pass / Fail Channel Loss, dB		
Max Loss = (F*L) + (SL*NS) + (CT|CL*NC) + (DL*ND) + UA					Pass / Fail ORL Loss, dB	35.00	35.00

Statistical Analysis - Análisis Estadístico

Applied Standard:

Figure 81, Customised worksheet - Spanish

Modifications to the Master Layout template will affect all new KITS™ workbooks. However it will be overridden should KITS™ be upgraded or reloaded at a later date.

The Master Layout template, KitsXls.xls is typically installed under ***<Drive>:\Documents and Settings\All Users\Application Data\Kingfisher\ KITS4.***

Modifying an existing or open KITS™ workbook, and saving it with a specific name, is preferred by many users as it permits them to create several customised worksheets.

- Once modified the changes should be protected. The two methods of protecting the changes are covered in Section **18.3** below.

18.2.1 Modification Rules

Live Data

The text in cells with a blank or dark blue background may be changed.

Loss Testing

The text in cells with a blank background may be changed.

18.3 Protecting a worksheet design

This is very handy for working on assorted jobs, changing languages, terminology, and so on. Windows offers two methods for creating a protected worksheet. These are:-

1. Write Protecting a file or by
2. creation of a Template.

As these are standard Windows functions, instruction are not given within this manual.

18.4 Designing a Customised Report Sheet

From years of experience in customer support, it is recognised that a generic report sheet format can never satisfy different user needs. A new report generating function is provided in KITS™ that allows users to design their own report worksheet and automatically populate the test data to the custom designed report worksheet.

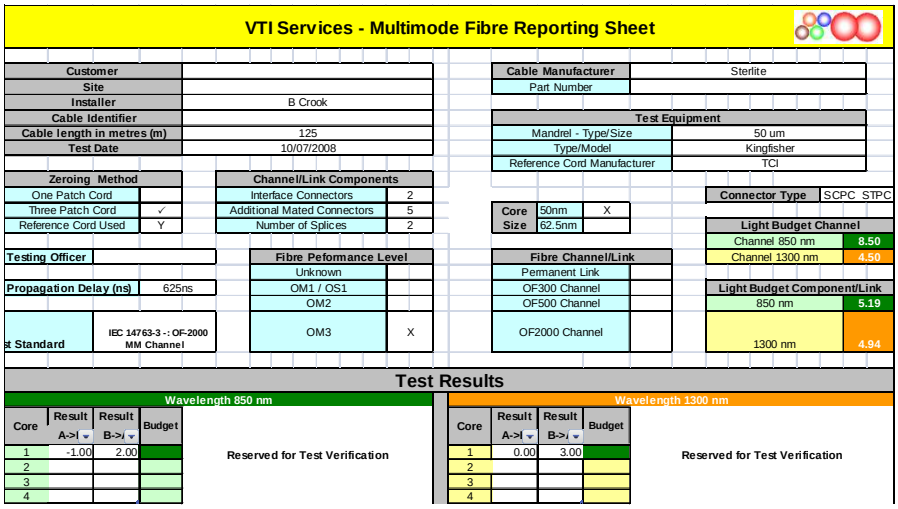
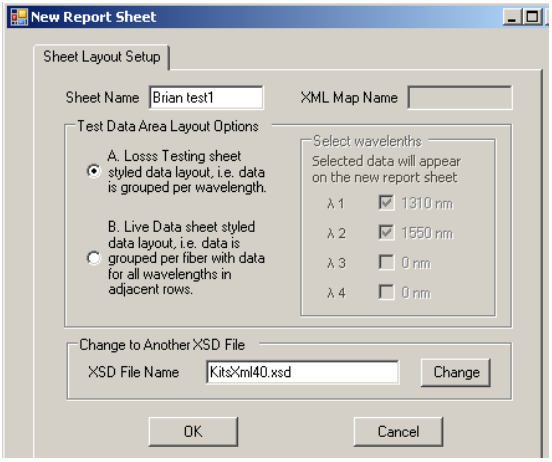
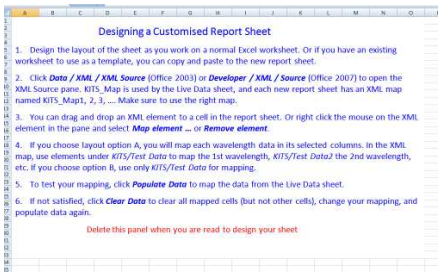
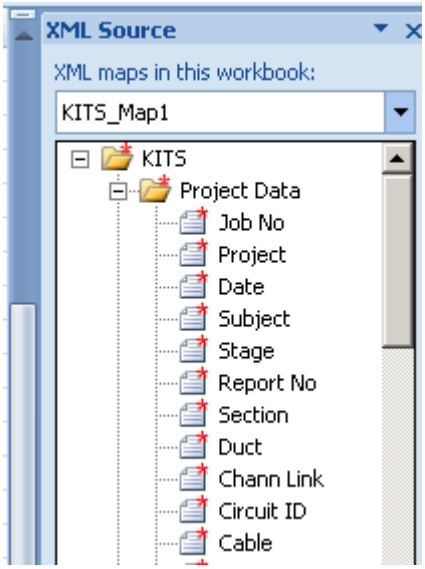


Figure 82, Customised Report layout

Step	Designing a Cutomised report sheet
1	It is suggested that the design of the new report sheet be performed or obtained before starting. Alternatively, you can design the layout of the sheet as you work.
2	Create a new or open a saved KITS™ workbook, set up all parameters for the Live Data sheet.
3	From the Kingfisher menu bar, click ***New Report***. A "New Report Sheet" form will pop up.  **Figure 83, Create New Report**
4	Enter in a sheet name.

Step	Designing a Cutomised report sheet
5	Choose data layout option A or B • A is the layout of the Loss Testing sheet, where one Excel row has data for all wavelengths of one fiber. • B is the layout of the Live Data sheet, where one Excel row has data for one wavelength and data for one fiber is grouped in consecutive rows). For option B, you can tick check boxes to decide which wavelengths to include in the report. By default the new report worksheet uses the same XSD (XML Schema Definition) file as used by the Live Data sheet. You can customise this file and supply it to the new report.  **Figure 84, Choose data layout option** XML Map Name shows the name of the XML map for this sheet. It is empty before the sheet is created
6	Click ***Ok*** to complete. A new sheet is created which contains a picture frame with instructions to customise a report sheet.  **Figure 85, Picture frame – instructions** Read and delete this frame before you start designing the sheet (or copy it somewhere else, as you may need to refer to it later).
7	If you have an existing worksheet to use as a template, you can copy part or the whole sheet and paste it into the new report worksheet. Alternatively you can design the layout of the sheet as you work.

Step	Designing a Cutomised report sheet
8	In KITS™, click the Excel menu item ***Data / XML / XML Source*** (Office 2003) or ***Developer / XML / Source*** (Office 2007) to open the XML Source pane.  **Figure 86, XML source pane** A dropdown list on the top of the pane shows the XML maps in the workbook. • KITS_Map is used by the Live Data sheet, • The new report sheet has an XML map named KITS_Map1. Any subsequent report sheets willbe named with the suffix 2, 3, etc. **Note:** You must use the correct XML map, otherwise the data cannot be populated correctly.
	The KITS_Map and subsequent XML maps, are divided into 13 sections, being:- Project Data, A Terminal, B Terminal, Cable Details, Pass Formula1, Pass Formula2, Pass Formula3, Pass Formula4, Stat Analysis, Test Data, Test Data2, Test Data3 and Test Data4.
9	You can drag and drop an XML element to a cell in the report sheet. Alternatively right click the mouse on the XML element in the pane and select ***Map element …*** or ***Remove element***.
10	**If you choose layout option A:** You will need to map each wavelength data in its selected column. • Use elements under **KITS/Test Data** to map the first wavelength, • Use elements under **KITS/Test Data2** to map the second wavelength, etc. **If you choose layout option B:** Use only **KITS/Test Data** for mapping.
11	To test your mapping, click ***[Populate Data]*** to map the data from the Live Data sheet.
12	If not satisfied, click ***Clear Data*** to clear all mapped cells (but not other cells), change your mapping, and then re-populate the data.

18.4.1 XML Mapping Tips:

- A XML element can be mapped only once. If you do want a piece of data to appear in another cell, you can use an Excel formula to refer to the mapped cell.
- A XML element which maps with a blue background and a pull down arrow (

) is called a repeating element, which allows the element to appear any number of times. This is used to map an array of data. The first cell is for the title with the data mapped to the rows below. You can either use this title as the heading, rename it with your own heading or hide the title element.
- A repeating element, such as the fibre number cannot auto size. If you do want to change the number fibres , you can manually edit the new XML work book
- To remove a mapped repeating element, first do ***Remove element*** from the XML pane, then click on the mapped element (where the dropdown icon still appears), click Excel menu ***List / List / Convert to Range*** (Office 2003) or ***Design/Convert to Range*** (Office 2007) to convert the area to normal Excel range. After that, you can remap the element.
- To know which XML is mapped to the current report sheet, open the XML pane, click on a mapped cell, the pane will show the map with the element that is mapped to the cell selected. Alternatively, click the ***Setup*** button, the XML Map Name in the popup form shows the name of the map.
- If you map repeating elements to adjacent columns in the sheet you may receive an "XML map is not exportable" error when you try to export the XML data. Click ***Options*** in the XML pane, and deselect ***Automatically Merge Elements When Mapping***. Alternatively, depending upon your design, you can insert a column in between two XML mapped lists and set its width to 0 (this may affect other rows in the sheet).
- You can copy the XSD file KitsXml40.xsd (typically under *<Drive>:\Documents and Settings\All Users\Application Data\ Kingfisher\KITS4*) to another file, remove the elements in KITS/Test Data[234] that are not needed and rearrange the remaining elements so that KITS/Test Data[234] can be mapped to an XML list as a whole.
  Then, from within the customised KITS™ worksheet, run [***Setup]*** to change to the new XSD file name.

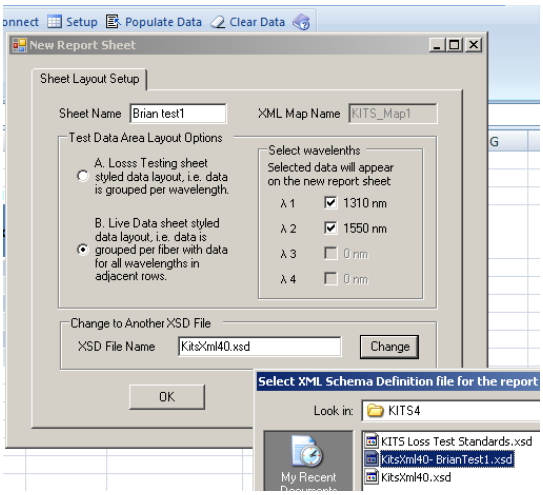


Figure 87, Customised XSD

19. TECHNICAL TIPS

19.1 Running an additional KITS™ Workbooks

Due to the restriction in resource sharing, only one KITS™ workbook can run within one Excel application. To run additional KITS™ workbooks, you must start another Excel application (***Start / programs / Microsoft Office / Excel***), then open an existing or start a new KITS™ workbook.

The two KITS™ workbooks each run in their own workspace without interfering with another.

19.2 Opening an Old format KITS™ Workbook

If you have a workbook saved by an earlier release of KITS™, it may not work properly with the new release because of the changes made to the program as well as sheet layout. Open the workbook in Excel and see how much existing data is still available. You may still be able to retain some of the data.

In the worst case, you can create a new KITS™ workbook, enter the setup parameters following the settings of the old one, and manually copy the data you want to keep and paste it to the new KITS™ workbook. The special windows 'Clipboard' function, which permits copying and pasting of multiple items is ideal for this. **Figure 88** below shows its location in Office 2007.

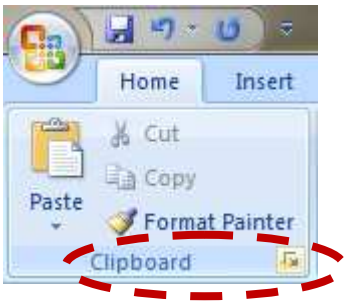


Figure 88, Clipboard function Office 2007

APPENDIX A
SUPPORT

A comprehensive range of FAQs is available on our web site at:-
http://www.kingfisherfiber.com/Fiber-Optic-Test-Equipment/Kits-Software/FAQ/Index.htm
or via www.kingfisherfiber.com and select ***Support.***

For advanced technical support support, let us know:

- The KITS™ version and build date. This can be found located in KITS™, under Kingfisher / about KITS,
- Your instrument model number, firmware version and serial number.
  - KI7000 instrument firmware version is displayed during instrument start-up,
  - KI2000 series instruments require holding down [F4] during turn on
  - and the instrument serial number is usually on the rear label.
- Your Windows and Office versions, including any non-English language options.

If you have any suggestions for improvement to this document or to the software, please contact sales@kingfisher.com.au

A.1 Re-enabling the KITS™ Add-In

KITS™ runs as an Excel Add-In named KIAddin. Occasionally this Add-In may become disabled. When this happens, you can follow these steps to re-enable it.

Excel 2007

Step	Procedure
1	Click the ***Office*** button (the top left corner of Excel), then click ***Excel Options / Add-Ins***
2	If KIAddin is disabled, you can see it in the list "Disabled Application Add-Ins" (near the bottom)
3	In the drop down list (at the bottom), select ***Manage: Disabled Items / Go***
4	Select ***KIAddin /*** Click ***Enable / Close***
5	Back to the same drop down list, select ***Manage: COM Add-Ins / Go***
6	Select ***KIAddin / Ok***

Excel 2003 and earlier:

Step	Procedure
1	Click ***Help / about Microsoft Office Excel / Disabled Items***
2	Select KIAddin and then ***Enable***.

If KIAddin is not visible in the list of disabled items, you need to run "Add or Remove Programs" from Windows Control Panel to repair KITS™.

APPENDIX B
RS232 / USB DRIVER CONFIGURATION & INSTALLATION

Early instruments used a RS232 interface, later instruments use an USB interface.

B.1 RS232

Prior to version 4.14, KITS™ required that Com port assignment be in the range of 1~4. Version 4.14 removed this restriction.

If a new RS232 lead is needed for a legacy instrument, the connection details are as follows.

	Wire 1	**Wire 2**	**Wire 3**
Instrument Jack Plug	Body (Gnd)	Ring (Tx)	Tip (Rx)
9 Pin D connector	Pin 5 (Gnd)	pin 2 (Rx)	Pin 3 (Tx)
25 pin D connector	Pin 7 (Gnd) **	Pin 3 (Rx) **	Pin 2 (Tx)

Table 1, RS232 pinout

Note 1: ** Some (out of spec) serial ports need a 10 K resistor in the D connector across wires 1 & 2.

Note 2: If your instrument has an RS232 interface and your computer does not, then you will need to install a suitable USB to RS232 adaptor/driver.

These can be purchased from most computer supply shops or from Kingfisher International as part number OPT188.

Note 3: with some versions of Windows the USB to RS232 driver is only installed on one USB port! In this situation, either note the correct USB port or also install the driver on the other USB ports.

B.2 USB Power

Some computers, particularly laptops, may be configured to shut off power to the USB port.

If KITS™ seems to hang for no reason this may be due to the power management settings.

KITS™ is a real-time data acquisition program, and computer power management settings may need to be modified or disabled.

B.3 Change Meter Port

Users normally do not need to consider the meter port as KITS™ finds the port automatically on connection. The sequence is that KITS™ searches an available USB port first, and then search for an RS232 port.

The Change Meter Port menu item is useful if multiple KITS™. applications are running in the same computer (e.g. in a laboratory situation). In this situation, the user may need to specify the COM port manually for a particular instance of KITS™.

B.4 USB KI7000 series

The KI7000 series USB instruments use a HID interface that is built into Windows.

B.5 USB KI2000 series

Beginning with a KITS 4.14 build, the KI2000 device driver is installed along with the KITS software.

The default KI2000 device driver location is:-

c:\ProgramData\Kingfisher\KI2000 Driver installer.

X86 for 32 bit and x64 for 64 bit machines.

If manual installation is required, you can run the .exe (x86 or x64) program located this folder.

APPENDIX C
USE OF INTERNATIONAL AND OTHER STANDARDS

KITS™ 4.10 introduced the option of Standards based testing. When selected, KITS™ automatically configures the workbook with a set of defined parameters for Pass/Fail assessment.

Four parameter based pass/fail options are provided:-

1. International Standard
2. Other Standard
3. Custom Specification
4. Simple Limit

Figure 89, Standard Selection

The Standards can be modified, deleted or added to. The default file location is:-
C:\Documents and Settings\All Users\Application Data\Kingfisher\KITS4

Note: any changes will be overridden, should a KITS™ update be applied or the program be re-installed.

C.1 International Standards

As installed, this workbook is preconfigured for IEC and TIA insertion loss Standards. The data is stored in the file **Int-LossTest-Standards.XLS**. The file is Write Protected to prevent accidental changes.

Note that the pass/fail parameters for the IEC standards involve a formula complexity not seen in the TIA standards.

Should other International Standards be required to be referenced, contact your nearest KI distributor or Kingfisher International directly.

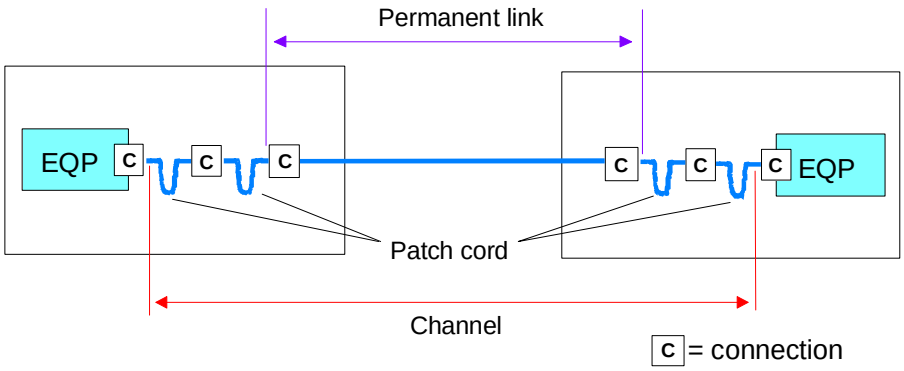
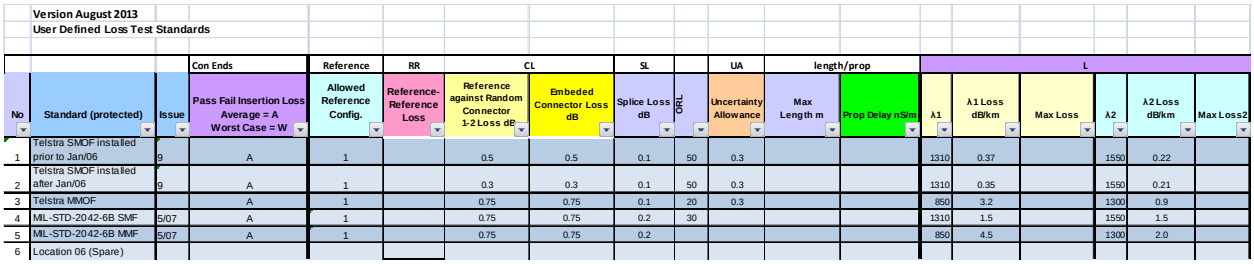


Figure 90, Channel & Permanent link in accordance with ISO 11801

C.2 Other Standards

As installed, this workbook is preconfigured for 3 Telstra Corporation insertion loss standards and MIL-STD-2042. The data is stored in the file **User-LossTest-Standards.XLS.** This file is Write Protected to prevent accidental changes.



Version August 2013
User Defined Loss Test Standards

			Con Ends	Reference	RR	CL		SL		UA	length/prop		L					
No	Standard (protected)	Issue	Pass Fail Insertion Loss Average = A Worst Case = W	Allowed Reference Config.	Reference-Reference Loss	Reference against Random Connector 1-2 Loss dB	Embeded Connector Loss dB	Splice Loss dB	ORL	Uncertainty Allowance	Max Length m	Prop Delay nS/m	λ1	λ1 Loss dB/km	Max Loss	λ2	λ2 Loss dB/km	Max Loss2
1	Telstra SMOF installed prior to Jan/06	9	A	1		0.5	0.5	0.1	50	0.3			1310	0.37		1550	0.22	
2	Telstra SMOF installed after Jan/06	9	A	1		0.3	0.3	0.1	50	0.3			1310	0.35		1550	0.21	
3	Telstra MMOF		A	1		0.75	0.75	0.1	20	0.3			850	3.2		1300	0.9	
4	MIL-STD-2042-6B SMF	5/07	A	1		0.75	0.75	0.2	30				1310	1.5		1550	1.5	
5	MIL-STD-2042-6B MMF	5/07	A	1		0.75	0.75	0.2					850	4.5		1300	2.0	
6	Location 06 (Spare)																	

Figure 91, User Loss Test Standard file

You can modify or add to the existing Other Standard list. The data field functions & requirements are:

Column A: No:

Numbers the standards. As installed, these are numbered 1 to 6. To provide for more than 6 standards, add additional numbering. e.g. 7

Column B: Standards (Protected) / User Definable.

Enter name of the standard or local specification here.

Column C: Issue Number

Enter version number of the standard or local specification here.

Column D: Pass/Fail Insertion Loss

This cell defines the way in which test results are assessed for a Pass/Fail condition. When testing to International Standards, this is usually assessed against the Worst Case single direction result. By comparison, many telcos assess their Pass/Fail criteria against the two-way average.

Enter an 'A' for two-way Average or a 'W' for Worst Case assessment.

Column E: Allowed Reference Configuration.

The number of test cords permitted to be used in establishing a reference condition may be defined.

E.g. for International Standards, only 1 or 3 lead referencing is permitted, whilst for NBN Co work 2 is specified.

Enter the allowed test cord referencing configurations, separated by a comma. Thus to permit all 3 configurations use 1, 2, 3. For 1 & 3 lead referencing only enter 1, 3.

Note: At time of this manual preparation, the IEC/ISO Internatiomal S`1tandards bodies were considering introducing a modified 3 cord reference method. In reality this proposed method is a 1 test cord reference method.

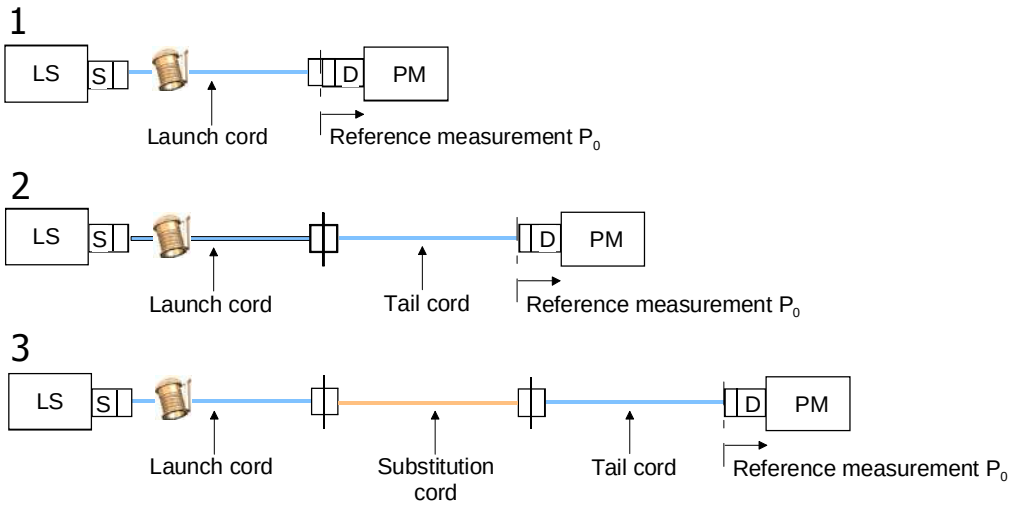


Figure 92, Referencing configurations

Column F: Connector 1-2 Loss dB

Some standards mandate that the mated DUT to test cord connections shall have a lower maximum allowable loss to any other mated connectors that may be in the DUT /installed cabling.

Enter the Maximum Allowable loss in dB for the first two, or end connectors here. You must also enter a value for any subsequent mated connectors under 'Connector other loss' as detailed below. Typically MMF= 0.1 dB and SMF = 0.2 dB.

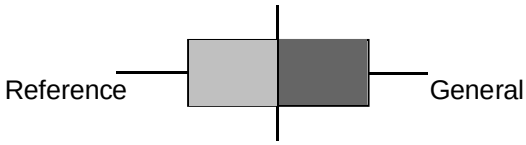


Figure 93, Standard symbol: Connection Reference against DUT

Column G: Connector Other Loss dB

Enter the Maximum Allowable loss in dB for any subsequent mated connectors here. Typically 0.75 or 0.3 dB

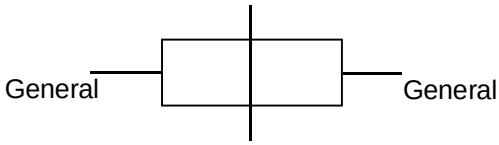


Figure 94, Standard symbol: Connection General against General

Column H: Splice Loss dB

Enter the Maximum Allowable splice loss in dB here. Typically 0.1 dB

Column I: ORL

Enter the Maximum Allowable ORL in dB here. The entered ORL value can be $^{+}$Ve or $^{-}$Ve; the software will automatically convert the number to absolute.

Column J: Uncertainty Allowance dB

If required, enter the measurement uncertainty in dB.

Depending upon the KITS™ build, the uncertainty value will be treated in one of two ways.

- **Early 4.14 Builds:** The uncertainty number is added to the calculated maximum link loss.
- **Later 4.14 builds:** Any insertion loss result falling within the specified uncertainty value of the calculated maximum link loss, will be reported in the Live Data Sheet as 'Marginal'. Refer to **10.3.1.1** for definitions of Pass, Marginal and Fail.

Common values for measurement uncertainty are in the range of 0 to 0.3 dB.

Measurement uncertainty is also affected by the referencing method.

> **Note:** The terms measurement 'uncertainty' 'repeatability' and 'reproducability' are often treated as the same. This is not so, they are differing error measurements with different values.

Column K: Max Length m

Enter any maximum allowable length in metres.

Column L: Propagation Delay ns

If propogation delay is required to be reported, enter the required delay paramter in nano seconds/metre (ns/m), here.

The software will automatically calculate the propagation delay in ns..

> PD = length m * (1000 *IOR) / C. Where IOR is the cables Index of Refraction and C is the speed of light.

For example: IOR = 1.469 => 4.90 ns/m, IOR = 1.490 => 4.97 ns/m.

For International Standards based testing use 5 ns.

Columns M-X: Wavelength parameters

Specifications in dB/Km or maximum loss for up to 4 wavelengths may be entered here.

Parameters are:

1. Wavelength, nm
2. Loss in dB/km, or
3. Maximum allowable loss dB

APPENDIX D
LICENSE & WARRANTY

D.1 End-User-License Agreement for Kingfisher International software

IMPORTANT - READ CAREFULLY: This Kingfisher International End-User License Agreement ("EULA") is a legal agreement between you (either an individual or a single entity) and Kingfisher International for the Kingfisher software products, which include computer software and may include associated media, printed materials, and "online" or electronic documentation ("SOFTWARE PRODUCT"). By installing, copying, or otherwise using the SOFTWARE PRODUCT, you agree to be bound by the terms of this EULA. If you do not agree to the terms of this EULA, do not install or use the SOFTWARE PRODUCT; you may, however, return it to place of purchase for a full refund.

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- Separation of Components. The SOFTWARE PRODUCT is licensed as a single product. Its component parts nay not be separated for use on more than one computer.
- Rental. You may not rent, lease, or lend the SOFTWARE PRODUCT.
- Support Services. KINGFISHER may provide you with support services to the SOFTWARE PRODUCT ("Support Service"). Use of Support Services is governed by the Kingfisher policies and programs described in the user manual, in "online" documentation, and/or in other Kingfisher-provided materials. Any supplemental software code provided to you as part of the Support Services shall be considered part of the SOFTWARE PRODUCT and subject to the terms and conditions of this EULA. With respect to technical information for product support and development. Kingfisher will not utilise such technical information in a form that personally identifies you.
- Software Transfer. You may permanently transfer all of your rights under this EULA, provided you retain no copies, you transfer all of the SOFTWARE PRODUCT (including all component parts, the media and printer materials, any upgrades, this EULA, and, if applicable, the Certificate of Authenticity), and the recipient agrees to the terms of this EULA. If the SOFTWARE PRODUCT is an upgrade, any transfer must include all prior versions of the SOFTWARE PRODUCT.
- Termination. Without prejudice to any other rights, Kingfisher may terminate this EULA of you fail to comply with the terms and conditions of this EULA. In such event, you must destroy all copies of the SOFTWARE PRODUCT and all of its component parts.

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If the SOFTWARE PRODUCT is labelled as an upgrade, you must be properly licensed to use a product identified by Kingfisher as being eligible for the upgrade in order to use the SOFTWARE PRODUCT. A SOFTWARE PRODUCT labelled as an upgrade replaces and/or supplements the product that formed the basis for your eligibility for the upgrade. You may use the resulting upgraded product only in accordance with the terms of this EULA. If the SOFTWARE PRODUCT is an upgrade of a component of a package of software programs that you licensed as a single product, the SOFTWARE PRODUCT may be used and transferred only as part of that single product package and may not be separated for use on more than one computer.

D.2.4 COPYRIGHT

All title and copyrights in and to the SOFTWARE PRODUCT (including but not limited to any images, photographs, animations, video, audio, music, text, and "applets" incorporated into the SOFTWARE PRODUCT), the accompanying printed materials, and any copies of the SOFTWARE PRODUCT are owned by Kingfisher or its suppliers. The SOFTWARE PROUCT is protected by copyright laws and international treaty provisions. Therefore, you must treat the SOFTWARE PRODUCT like any other copyrighted material except that you may install the SOFTWARE PRODUCT on a single computer provided you keep the original solely for backup or archival purposes. You may not copy the printed materials accompanying the SOFTWARE PRODUCT.

D.2.5 DUAL-MEDIA SOFTWARE

You may receive the SOFTWARE PRODUCT in more than one medium. Regardless of the type or size of medium you receive, you may use only one medium that is appropriate for your single computer. You may not use or install the other medium on another computer. You may not loan, rent, lease, or otherwise transfer the other medium to another user, except as part of the permanent transfer (as provided above) of the SOFTWARE PRODUCT.

D.3 WARRANTY

LIMITED WARRANTY. Kingfisher warrants that (a) the SOFTWARE will preform substantially in accordance with the accompanying written materials for a period of ninety (90) days from the date of receipt, and (b) any Kingfisher hardware accompanying the SOFTWARE will be free from defects in materials and workmanship under normal use and service for a period of one (1) year from the date of receipt. Any implied warranties on the SOFTWARE and Kingfisher hardware are limited to ninety (90) days and one (1) year respectively. In states/jurisdictions which do not allow limitations on duration of an implied warranty, these limitation may not apply to you.

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